# Story of COMMUNICATION

CURRICULUM

TEACHERS' RESOURCE BOOK

GRADE V SECTION D

DEPARTMENT OF EDUCATION

## ACKNOWLEDGMENT

This Resource Unit has been published under the direction of the Provincial Elementary School Curriculum Committee of the Department of Education, which appointed a Resource Unit Sub-committee to evaluate and revise resource units prepared by various school systems, with a view to making those of outstanding value available to the teachers of this province.

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"The Story of Communication " was originally compiled by the Edmonton Elementary Teachers' Association in co-operation with the Edmonton School Board. It has been revised by Miss G. Bramley-Moore, teacher at Prince Charles School, Edmonton, under the direction of the Resource Unit Sub-committee.

## TABLE OF CONTENTS

## HOW TO USE A TEACHER'S RESOURCE UNIT

A teacher's resource unit contains information, outlines, problems and suggested activities which are useful in developing an enterprise theme. It is designed to provide an abundance of suggestions from which the teacher with the help of his class may plan a unit or several units of study.

Such an outline is not entirely suited to every class. The nature of community interests, library facilities and past experiences of the class all have a bearing on the way in which an enterprise should develop. Rigid adherence to any outline may result in poor teaching. The eventual outline that the teacher and his class make is the only one guaranteed to be successful, for only they can judge just how useful any idea or suggestion may be.

The pupils should have a share in planing and if the overview has been good they will understand and identify the problems as their own. The overview is the beginning stage in developing an enterprise when time is taken to see filmstrips, arrange visual material on the bulletin board, and to read generally about the people of the enterprise. The overview is largely exploratory and must give enough information to arouse keen interest and permit intelligent participation in planning.

A resource unit thus suggests a few of the problems, sources of information and skills that should be developed by the student. It in no way limits the development of the enterprise. Instead it is hoped that the suggestions given here will stimulate more successful planning.

Probably every worthwhile enterprise results in some creative effort on the part of the pupils. This should be encouraged to the fullest extent. The fields of creative work should be increasing in Grades V and VI.

In language expression the child should be encouraged to choose colorful words and fitting phrases. Weaknesses in English should be corrected but not at a time when the correction will limit enthusiasm.

It has been told how a class who upon taking a unit entitled "Communication" visited a printing office and on their return to the classroom made a deliberate attempt to portray the mechanical workings of a linotype in a piece of music of their own devising. Accompaniment for percussion instrument produced the thudding, clinking and ringing sounds peculiar to the machines. All ideas were encouraged and as a result a highly stylized piece of rhythmic music was produced, that was tested in each new part by using the sound patterns of the machines as the point of reference.

Art and construction work should be a result of a child's own ideas. Information which the construction represents should be exact in every detail, but inside of these limits the child should be encouraged to build, draw or paint as he sees fit. Copy work from references should be discouraged entirely.

Some groups do best in dramatic work and will respond wonderfully to encouragement. Whatever line the creative interests take the experiences should be happy, meaningful ones for the pupils.

# THE STORY OF COMMUNICATION

The purpose of the unit is to emphasize the historical aspect of communication. From the earliest ages man has devised means of communication through sound and sight. These means of communication were based on symbols, aural or visual, that expressed ideas. Many changes have taken place in the art of communication. A study of the history of early communication is necessary to understand and appreciate how these changes have affected society.

## OBJECTIVES

1. An awareness of changes in communication and how these changes have affected modern living.
2. An appreciation of the foresight, courage and perseverance of the men responsible for these changes.
3. Experience in gathering and organizing information through use of library, experiments, correspondence, interviews and field trips.

### For Motivation

1. STORIES
    1. The Paper that Talked
2. STORIES TO READ
    1. Radio Rescue, P. 116 Times and Places
    2. Messages from the Sea, P. 122 Times and Places
    3. Yinka-Tu and the Secret Message, P. 290 Proud Processions
3. POEMS
    1. Then, P. 95 Gay Adventures
    2. Spreading the News, P. 110 Gay Adventures
4. FILMS

    T-194 Development of Communication

### Time Lines for Progress in Communication

| | |
|---|---|
| 10000 BC | Earliest drawings |
| 3500 BC | Cuneiform writing used by the Babylonians in the Euphrates Valley |
| 1600 BC | Alphabet used by Semites and Phoenicians in Palestine |
| 1000 BC | Papyrus used by Egyptians |
| 800 BC | Libraries used by Assyrians in Nineveh, Mesopotamia |
| 300 BC | Numerals used by Hindus |
| 200 BC | Parchment used by Hindus |
| 1000 | Printing from blocks done by the Chinese<br>First newspapers published by Chinese |
| 1454 | Printing from movable print invented by Gutenberg in Germany |
| 1615 | Newspapers printed in Germany |
| 1639 | First press in United States—Stephen Day |
| 1792 | Semaphore signalling or ocular telegraph invented by Chappe brothers in France |

| | |
|---|---|
| 1797 | Lithography invented by Aloys Senefelder in Germany |
| 1799 | Rosetta Stone and key to ancient languages discovered by Boussard in Egypt |
| 1807 | Papermaking machine developed by Henry Fourdrinier in England |
| 1814 | Cylinder press invented by Frederick Koenig |
| 1828 | First comprehensive dictionary published by Noah Webster in Connecticut, United States |
| 1829 | Braille for the blind introduced by Louis Braille, Paris |
| 1839 | Photograph—Louis Daguerre, Paris |
| 1840 | Prepaid gummed postage stamps, Rowland Hill, England |
| 1844 | Telegraph—Samuel Morse |
| 1858 | Submarine Cable—C. W. Field, United States |
| 1861 | Color photography—James Clark Maxwell, England |
| 1867 | Typewriter—Christopher Sholes, United States |
| 1876 | Telephone—Alexander Graham Bell |
| 1884 | Automatic typesetter (linotype) Ottman Mergenthaler |
| 1885 | Automatic typesetter (monotype) Tolbert Lanston |
| 1888 | Photographic film—Eastman |
| 1894 | Motion picture projector—Charles Francis Jenkins |
| 1896 | Wireless—Guglielmo Marconi, Italy |
| 1907 | Radio vacuum tube grid—Lee de Forest |
| 1930 | Photo-electric cell for sound projection, television—Vladimir Zworkin, Farnsworth and others. |

## PROBLEM I

### EARLIEST ATTEMPTS AT COMMUNICATION

| Subject Area | Suggested Problems | Suggested Activities | References |
|---|---|---|---|
| Social Studies | How did prehistoric man communicate? | Prepare a pantomime about Prehistoric Man communicating in sign language | World's Messengers |
| **The Development of Writing** | | | |
| | What was the picture writing of primitive peoples like? | Make large map showing where Ancient Peoples lived. Tell a story by means of picture writing | World's Messengers |
| Language | Read Hiawatha—Picture Writing, by Longfellow. | Choral recitation | World's Messengers |
| | What were the stages in the development of writing in Ancient Egypt? | Write sentences using hieroglyphics. | Builders of The Old World<br>World's Messengers |
| Social Studies | What forms of writing were used by the Assyrians and Babylonians? | Make designs using the various forms of early writing. | |
| Social Studies | What type of writing is used in China even today? | Collect pictures and start scrap book. | World's Messengers |
| Social Studies | Who invented the first alphabet and what modifications were made in this alphabet by the Greeks and Romans? | Make a chart of the alphabets contributing to our present day alphabet. | Builders of The Old World |

| Subject Area | Suggested Problems | Suggested Activities | References |
|---|---|---|---|
| Art | Study the development of the letters. | Make monograms using colorful designs. | Heels, Wheels and Wire |
| **Examples of Early Forms of Writing** | | | |
| | The Rosetta Stone | | |
| Social Studies | (a) Why were we unable to read Egyptian writing until very recently? | Collect pictures and add to scrap book | World's Messengers |
| | (b) When, where and how was the Rosetta stone found? | | |
| | (c) What three forms of writing does it illustrate? | | |
| Social Studies | The Moabite Stone | | |
| | (a) When and where was the Moabite Stone found? | Start list of new words | See Encyclopedia |
| | (b) What writing is on this stone? | | |
| **Writing Materials** | | | |
| Social Studies | What is papyrus and how was it made into paper? | | |
| | What were some of the materials used by the Ancient Peoples? | | |
| | How were clay tablets of the Babylonians made? | Make and write on wax and clay tablets | |
| | Who used wax tablets and how were they made? | Continue to collect pictures | World's Messengers |
| | What are parchment and vellum? | | |
| | What did the Chinese use for paper? | | |
| Science | Study a paper making process. | Visit a pulp mill if one is in your community | |
| **Books and Libraries** | | | |
| Social Studies | What do we consider to be the earliest library? | Make a scroll. | |
| | Find out about early libraries. | Make a page from a book handwritten by a monk. | The World's Messengers |
| | What type of documents made up these libraries? | | |
| | Who prepared these documents? | | |

| Subject Area | Suggested Problems | Suggested Activities | References |
|---|---|---|---|
| | What was the library of the early Egyptians like? | | |
| | How were the first books made? | | |
| | What are scrolls? — how were they preserved? | | |
| | What are the different types of manuscripts? | | |
| | Who were the scribes? | | |
| | How long did it take to copy a book? | | |
| **The Number System** | | | |
| Social Studies | Who were the first to use numbers ? What were the first numbers like? | Make a chart showing the development of the numbers. | Builders of the Old World |
| | Study the stages in the development of our number system. | | |
| Arithmetic | Compare the Arabic system to the Roman system of numerals | Try some similar problems both ways. | |

### BIBLIOGRAPHY FOR PROBLEM I


| | | |
|---|---|---|
| Webster, Hanson Hart | The World's Messengers | Houghton Mifflin Co., 1938 |
| Rogers and Beard | Heels, Wheels and Wire | J. B. Lippincott |
| Campbell, Webb and Nida | The Old World Past and Present | W. J. Gage and Co. |
| Chatterton, W. Gordon | Canada and Other Lands (easy reading) | Winston |
| Hartman et al. | Builders of the Old World | Copp Clarke Co. |


## PROBLEM II

### THE STORY OF PRINTING AND OF NEWSPAPERS

**The Development of Printing**

| | | | |
|---|---|---|---|
| Social Studies | What was the first printing like? | Make blocks for type. Do some linoleum block printing. | Builders of the Old World |
| | Who invented movable print and what is it? | | |
| Social Studies | Who invented the printing press? Study Gutenberg's life, his discovery of type metal, the difficulties he encountered and finally his success. | Write letter to ask permission to visit printing establishment. Only small groups should attempt to invade a printing shop. | Great Inventors and Their Inventions |
| | | Dramatize the life of Gutenberg. | |

| Subject Area | Suggested Problems | Suggested Activities | References |
|---|---|---|---|
| Social Studies | What is a linotype? Who invented it and what are its uses? | Make posters using various examples of printing.<br>Write stories for newspaper. | Old World Past and Present |
| | What is lithographing? | | |
| | What are the uses of the printing press?<br>Of what importance is it? | Start a "Name-the-Man" file for the various inventions.<br>Continue the word list. | |
| | **The Development of Newspapers** | | |
| Social Studies | Trace the history of early newspapers throughout the world — noting the first newspaper in Alberta and the first in your own community. | Visit a newspaper printing plant.<br>Write letters of appreciation for visit. | The World's Messengers |
| Social Studies | What role do newspapers play in communication? | Publish a class newspaper. | |
| Social Studies | What various means do newspapers have to gather news? | Continue word list | |

## BIBLIOGRAPHY FOR PROBLEM II


| | | |
|---|---|---|
| Bachman, Jessie Gertrude | Great Inventors and Their Inventions | American Book Company |
| Webster, Hanson Hart | The World's Messengers | Houghton Mifflin Company |
| Hartman, Saunders, Nevins | Builders of the Old World | Copp Clark Co. Ltd. |
| Campbell, Webb and Nida | Old World Past and Present | W. J. Gage and Co. |


## PROBLEM III

### THE STORY OF MESSAGES AND SIGNALS

**Oral Messages**

| | | | |
|---|---|---|---|
| Social Studies | 1. How did primitive peoples use the following as means of communication? | Make a tom-tom by stretching a skin tightly over a wooden keg. | The World's Messengers |
| | (a) drums<br>(b) bells or gongs<br>(c) whistles and sirens | Make your own code and send messages using tom-toms and drums.<br>Make a megaphone. | Heels, Wheels and Wire |
| | 2. What are the modern uses of these devices? | Make a chart showing many uses. | |
| Language | 3. Name some famous bells in history. | Read and tell stories about these bells.<br>Write stories and poems for class newspaper.<br>Read Bell of Atri — from Tales of Wayside Inn by Longfellow.<br>Read Edgar Allan Poe's poem "The Bells". | |

| Subject Area | Suggested Problems | Suggested Activities | References |
|---|---|---|---|
| | 4. Trace the carrying of messages from the town crier to the radio announcer of today. | Dramatize | |
| **Visual Messages** | | | |
| Science | 1. How has man used the following as means of communication? | Make a mural showing various ways messages were sent. | |
| | (a) fires and beacons<br>(b) heliographs<br>(c) quipu<br>(d) lighthouses | Make posters using road symbols used in traffic safety. | Heels, Wheels and Wire and Encyclopedia |
| | (e) semaphore signals and flags | Practice sending semaphore signals | |
| **Messages Carried By Man, Carrier Pigeon and Vehicles** | | | |
| Social Studies | Trace the story of carrying messages from the runners to the aeroplane of today. | Make a mural.<br>Write a short play.<br>Write stories and poems for the class newspaper. | |
| | What skills are needed for sending clear accurate messages? | Continue word list and collection of pictures. | |

### BIBLIOGRAPHY FOR PROBLEM III


| | | |
|---|---|---|
| Webster, Hanson, Hart | The World's Messengers | Houghton Mifflin Co. |
| Rogers, Beard | Heels, Wheels and Wire | J. B. Lippincott |
| Canadian Parade Readers | Proud Processions<br>Bells Page 340<br>Gay Go Up Page 345<br>Wheels Sound Page 346<br>Yinka Tu and the Secret Message Page 290 | J. M. Dent and Sons, 1947 |


## PROBLEM IV

### THE STORY OF POSTAL SERVICES

| | | | |
|---|---|---|---|
| Social Studies | Trace the development of mail-carrying from ancient times to the present. | Make a map to show major air-mail routes in Canada. | Heels, Wheels and Wire |
| | How does the post office operate? | Visit the Post Office. | |
| | What are some of the services given by the post offices? | Start a stamp collection and make a display on bulletin board of a variety of unusual stamps, cancelled stamps and post marks. | Film: Stage Coach to the Stars |

| Subject Area | Suggested Problems | Suggested Activities | References |
|---|---|---|---|
| Language | What is the correct form of writing a business letter? | Write a letter to the Post Office Department requesting a copy of Canada postal history notes. (One letter should be chosen for mailing. It should be countersigned by the teacher.) | |
| | What are some of the unusual ways of carrying mail? | Make a mural showing how mail was carried in early days and now, or one showing today's mailmen in different parts of the world. | Heels, Wheels and Wire |
| | How did better means of communication depend to some extent upon transportation? | | |

**BIBLIOGRAPHY FOR PROBLEM IV AS FOR PROBLEM III**

## PROBLEM V

### THE IMPACT OF ELECTRICITY ON COMMUNICATION

**A. The Telegraph**

| | | | |
|---|---|---|---|
| Social Studies | 1. (a) What were the beginnings of the telegraph? | Dramatize sending of first messages. | |
| | (b) What contribution did the Chappe brothers make? | | |
| | 2. What did Benjamin Franklin prove? | | |
| | 3. What part did each of the following play in the story of communication? | Start Time Line | |
| | Volta | Write to— Western Union Telegraph Co. 60 Hudson Street, New York 13 for pamphlets. | |
| | Oersted | | |
| | Henry | Try Oersted experiment using a compass, a dry cell and a piece of wire. | |
| | Faraday | | |
| Science | What is a magnet and an electromagnet? | Do experiments using magnets. | See notes |
| | How are they alike and how do they differ? | Make an electromagnet. | |
| | Describe the telegraph invented by Sir Charles Wheatstone and Sir William Cooke. | | |
| | Study the story of Morse's life, his invention of the telegraph and the code he developed. | Learn the Morse Code. | World's Messengers |
| | What improvements have been made on the telegraph? | Compose telegrams and cables. | |

| Subject Area | Suggested Problems | Suggested Activities | References |
|---|---|---|---|
| | How does a telegraph operate? | Visit the telegraph office.<br>Make a telegraph set and send messages using Morse code.<br>Add names to "Name-the-Man" file. | |
| **B. The Atlantic Cable** | | | |
| Social Studies-Science | What experiments did Samuel Morse make with underwater telegraphy? | Continue word list and collection of pictures. | |
| | What type of under water coating was developed for the cables? Why was there need for a new type of coating? | Add names to "Name-the-Man" file. | World's Messengers |
| | Tell the story of the laying of the Atlantic cable. | Add to Time Line<br>Write stories for newspaper. | |
| **C. The Telephone** | | | |
| Science | What is sound? | Make a graph to show the effect different materials have on the speed of sound transmission. | |
| | How are sound waves transmitted? | | |
| | Study the voice and how the voice box produces sound. | Decide what type of voice reproduces best. Do voice development exercises. | Discovering Our World Bk. III |
| Social Studies | Find out about the early life of Alexander Graham Bell. | Make a tin can telephone. | |
| | Tell the story of the invention of the first telephone. How did it work? | | World's Messengers |
| Science | What improvements have been made on the telephone? | Dramatize the use of the telephone — emphasize both skills and courtesy.<br>Make a telephone directory of classmates. | |
| Science | What is the meaning of<br>trans-oceanic telephony<br>telephotography<br>teletype<br>micro-wave? | Discuss recent developments.<br>Visit a telephone exchange office. | |
| | Of what importance is each of the above? | | |
| **D. The Wireless** | | | |
| Social Studies-Science | What were some of the important discoveries with respect to electrical energy? | By experiments find the value of a battery, what it is and how it can store up electricity. | |
| | What contributions towards the development of the wireless were made by Hertz and Maxwell? | | |

| Subject Area | Suggested Problems | Suggested Activities | References |
|---|---|---|---|
| | What contribution did Marconi make? | | |
| **E. The Radio** | | | |
| Health | Study the ear. | | Let's Be Healthy |
| Science | What inventions made wireless telephony or wireless speech possible? | Visit a radio studio.<br>Write letters | |
| Social Studies | What contributions towards communication was made by each of the following:—<br>Hertz<br>Trowbridge<br>Marconi<br>De Forest<br>Fessenden<br>Fleming | Add names to "Name-the-Man" file.<br>Make a microphone. | Great Inventors and Their Inventions<br>World's Messengers |
| Science | What is the Leyden jar? | By experiment show the value of the Leyden Jar in the advancement of communication. | See notes |
| Social Studies | How did De Forest improve the radio? | Write a radio play tracing the history of communication. | |
| | What five amazing things did Armstrong find that he could do with the audion or tube invented by De Forest? | Continue word list.<br>Continue making and collecting pictures for scrap book. | |
| | Of what importance is modern communication to our health? | Plan a radio program. | World's Messengers |
| | Why do you think the radio is a wonderful invention? | | |
| **F. Radar and Television** | | | |
| | What is the meaning of television? | Visit a television studio. | |
| | How does television differ from radio? | | |
| | What is a photo-electric cell? | | Encyclopedia |
| | What are some recent developments in radar and in television? | | |
| | What is the meaning of the word radar? | | |
| | What uses have been made of radar? | | |
| **G. Miscellaneous Means of Communication** | | | |
| | Of what importance is each of the following:<br>typewriter | | |

| Subject Area | Suggested Problems | Suggested Activities | References |
|---|---|---|---|
| | teletypes<br>phonograph<br>tape recorder<br>dictaphone<br>telephoto<br>camera and motion pictures | Complete Time Line and word list. | |

## BIBLIOGRAPHY FOR PROBLEM V


| | | |
|---|---|---|
| Webster, Hanson Hart | The World's Messengers | Houghton Mifflin Co. |
| Rogers and Beard | Heels, Wheels and Wire | Lippincott |
| Charters et al. | Let's Be Healthy | MacMillan |
| Bachman | Great Inventors and Their Inventions | Am. Book Company |
| Beauchamp | Discovering our World Bk. III | Scott Foresman & Co. |

## INFORMATIONAL MATERIAL

This material is to provide useful background information for the teacher only. Detailed material for the pupils will be found in the listed references.

### PROBLEM I

# EARLIEST ATTEMPTS AT COMMUNICATION

#### The Prehistoric Age

Before we can understand the growth of the art of communication and how it has affected society we must go back to prehistoric times.

#### What Is Meant by Prehistoric Man?

Prehistoric man lived before history was written in any form. We believe that in the beginning man was not able to talk, but could only make sounds like those of an animal. It is believed that he could laugh or cry, thus indicating his mood. It is likely he used gestures to make himself understood. Probably he made motions with his hands or pointed to objects to make known his desires. This was not very satisfactory for he could not tell about anything he could not see or touch.

#### Origin of Language

There are various theories as to how man first began to talk. No one knows for certain how this happened.

Words where the sounds suggest the meaning, for example, crack, bang, whizz, whistle, and sounds imitated from animals, for example cuckoo and miaow, give us a good idea of how speech may have begun. Gradually as the need to communicate grew man must have made some sound to indicate a special desire. After the same sound had been made many times to indicate the same meaning, other members of the tribe would start using it and so, very gradually, new sounds or words were developed.

These sounds or words were understood only by the immediate members of a tribe. People in that era were nomads: thus all or a few of the members moved to a new location from time to time. As new words were added, only those in the group that had moved together would know them. In this fashion each wandering tribe acquired a vocabulary of its own. It is from this simple beginning that differences in languages developed.

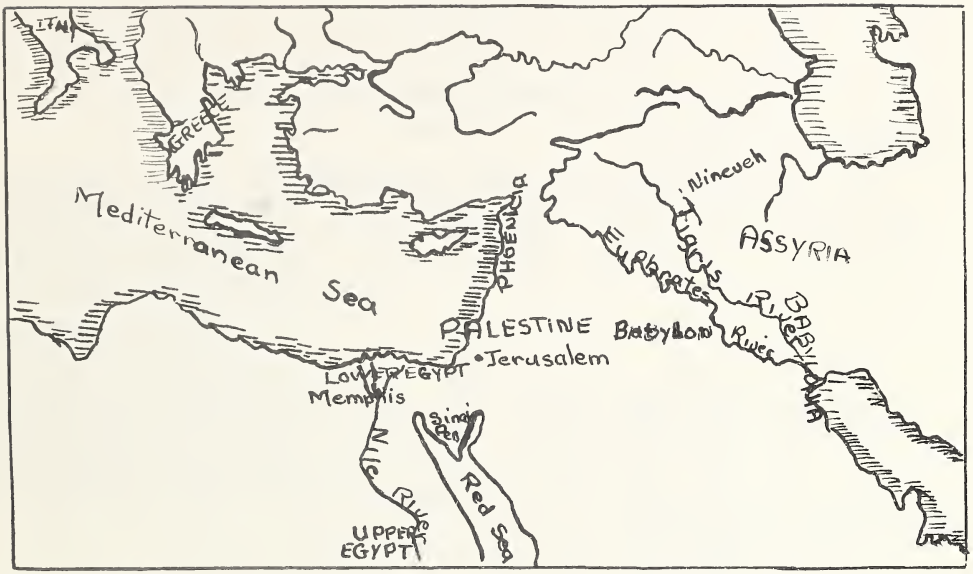
#### Map Study

Teach location of Egypt, Babylonia, Phoenicia, Assyria, Greece, Italy.

Locate Rome, Athens, Nineveh, The Nile, Euphrates and Tigris Rivers.

## WHAT DO WE MEAN BY THE LAND OF THE TWO RIVERS?

### Map of the Ancient World




### The Development of Writing

1. PICTURE WRITING

The Cavemen drew simple pictures of birds, animals, and objects about them. These pictures were drawn in the sand or on the walls of their caves. The Indians drew pictures on birch bark and on deer skin. They too used pictures of things about them. The sun meant day, the moon night, and so on. The Chinese were no doubt the first people to have a written language. They used, and still do use, characters for whole syllables or words. They have approximately 50,000 characters in their language.

2. HIEROGLYPHIC WRITING

The stages of Egyptian writing were: the pictogram, ideogram, syllabic and alphabetical.

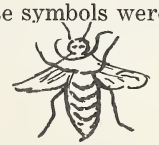
When the Egyptians first began to write they used simple pictures of familiar objects to represent the ideas of the writer.

A 

might represent the idea of insects, or of bees, or of wasps. Later the picture was used to make syllables which had the same sound as the drawn object although the meaning might be different, as in these cases—

 I  see  son

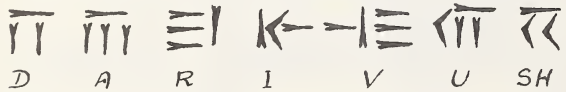
Gradually these symbols were used as the syllables of words

  —belief. We call this Rebus writing.

The final stage in the development of hieroglyphic writing was a system whereby certain symbols represented various sounds of the language.  for the sound L. or  for the sound R. The hieroglyphic writing of the Egyptians was used mainly for inscriptions on stone monuments, temples, tombs and obelisks.

3. CUNEIFORM WRITING

The writing of the Babylonians was named Cuneiform, meaning wedge-shaped.




The wedge shape developed it is thought from the fact that the reeds first used as pens had triangular shaped ends. Later a stylus developed.

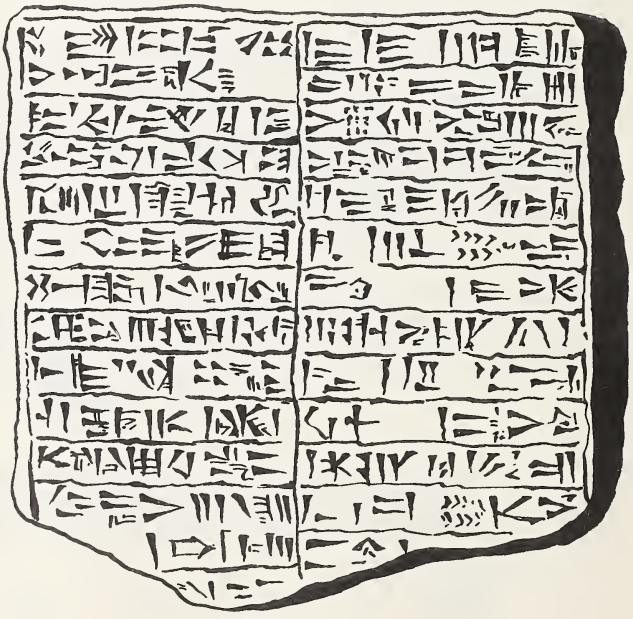

Cuneiform writing was invented by the Sumerian people who lived in the valley of the Tigris and Euphrates Rivers. The Sumerians developed their early script from a rude picture writing, some early forms of which have come down to us. Straight lines in soft clay, when made by a single pressure of the stylus, tended to become wedges.

The Assyrians patterned their writing after that of the Babylonians. Centuries later libraries of the clay tablets were discovered indexed and stored on shelves in their tombs. Many of these tablets are now in the British Museum.

4. THE ALPHABET

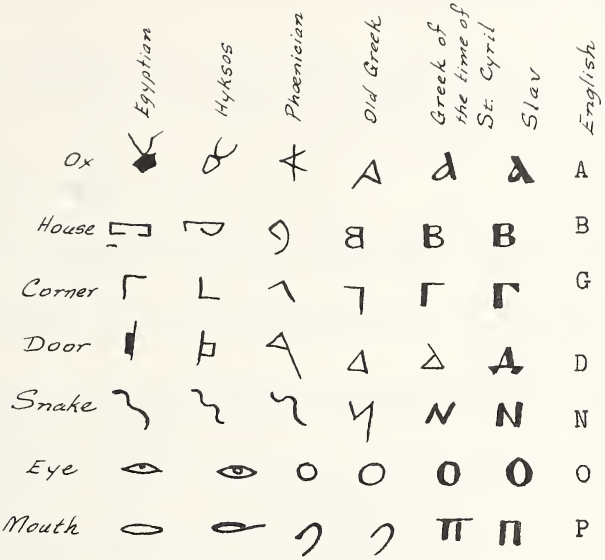
The Phoenicians used pictures of twenty-two simple objects, for example: house, ox, hand, fish, teeth, to represent syllables. By placing these pictures in a line they invented a method of writing sounds, since each of the twenty-two pictures represented a sound.

The Greeks adopted the Phoenician alphabet and added the vowels.



CUNEIFORM WRITING

The Romans later simplified the Greek alphabet.




**Early Examples of Writing**

1. THE ROSETTA STONE

The writing of Ancient Egypt had been a puzzle to scholars for hundreds of years, there being no way to decipher the meaning of their pictures and symbols. When the Rosetta Stone was found it acted as a key to their language.

In 1799, a French officer in Napoleon's army discovered the stone half buried in the mud near the Rosetta mouth of the Nile River. The stone is made of black basalt. It is about three and three quarter feet high and two and one-third feet across. Part of the top and a section of the right side are missing.

A decree of Ptolemy, King of Egypt, is carved on the stone. The first inscription is in the ancient Egyptian hieroglyphics. Below that is the common Egyptian language, while at the bottom of the stone the same message is written in Greek. A French scholar, Jean Francois Champollion, translated the Greek portion. Using this as a guide he next studied the position and repetition of proper names. In this way he was able to pick out the same names in the Egyptian text and after much hard work was able to read the entire inscription. In 1828 he published the results of his work. This book made it possible for other scholars to translate the writings of the Ancient Egyptians.

2. THE MOABITE STONE

This stone was found in 1868 by F. A. Klein, a missionary at Deban in Ancient Moab. The writing was carved in the Hebrew-Phoenician characters. A thirty-four line inscription on it tells of the deeds of Mesha, King of the Moabites (see II Kings 3:4-27). Through the translation of the characters on this stone scholars learned more about the early Hebrew-Phoenician languages.

## WRITING MATERIALS USED BY EARLY PEOPLES

1. Some of the earliest writing discovered was done on stone shafts called obelisks and the stone walls of temples. Sharp pointed instruments were used by the ancients to write on stone, and also on clay or wax.

2. Papyrus was made from a plant that grew along the Nile. The reeds of the plant were split and narrow strips laid side by side. Other strips were laid across them and a heavy weight laid on top. The sap in the fibres glued the two layers together. When dry, the papyrus was rubbed with stone until smooth.

A brush or hollow reed was used to write on the papyrus. Ink was made by mixing a sort of gum and soot.

3. The Babylonians patted soft clay into thick tablets. After writing on the tablet it was sprinkled with fine dry clay. Often a tablet was wrapped in more moist clay which served as an envelope. Tablets were dried in the sun or baked in kilns to be preserved.

4. Wax tablets were used by the Romans. A thin layer of wax was placed on boards. A stylus, a pointed stick or bone with one flat end, was used for writing. The flat end was used to smooth over mistakes.

5. Parchment later replaced the papyrus. Parchment is the skin of sheep or goats. After removing the hair, it is cured and then scraped, pounded and rolled until it is very smooth and thin.

Vellum is very fine parchment made from the skins of calves, kids and lambs.

6. The North American Indians used birch bark.

7. The Chinese were the first to use paper, which they made from rags. They used brushes or pieces of bamboo to do their writing.

8. The Arabs introduced paper-making into Europe. Much paper to-day is made from woodpulp. In the paper mills the bark is removed from the logs, which are then cut into smaller sections and then into chips. The chips are put into large tanks where they are cooked and treated chemically. The pulp flows over a large screen which sifts out unwanted material. After the pulp is cleaned and fluffed, it passes through many hot rollers until it is very dry. Finally it becomes a thin, smooth strip of paper.

A blend of pulp is used in making many special papers. Rag pulp is used for the finest writing papers.

### Books and Libraries

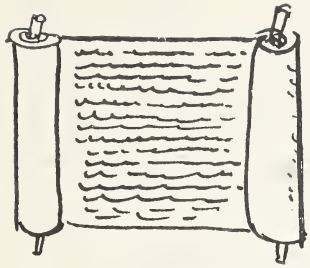
1. Man's attempts to leave a written record have resulted in books being made from clay, plants, wax, leather, cloth and paper.

The Babylonians who inscribed their messages on clay arranged the hardened tiles in one continuous series to form a book. These early books must have resembled a huge stack of bricks. These early clay tablet collections might be considered the first books.

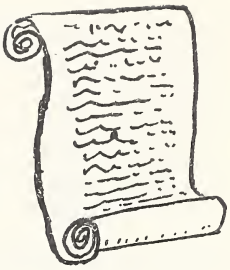
2. The writings of the Egyptians, Greeks and Romans were on scrolls of papyrus or parchment written with a reed pen.

To make a scroll, sheets of papyrus were pasted together. Some scrolls were many feet long; to overcome the clumsiness of this length the scroll was usually wound round a rod. After a time this type was changed to the kind in which the writing ran lengthwise on the scroll and two rods were used instead of one. As the reading of the scroll progressed, the portion read would be wound on the one rod while the unread portion gradually was unwound from the other rod.

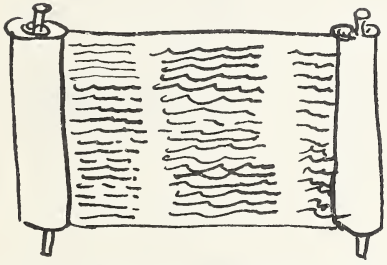
## SCROLLS



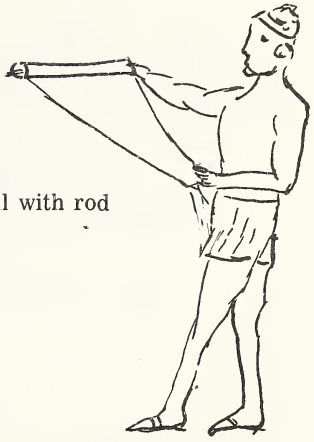
Scroll with horizontal writing and read crosswise



Papyrus scroll



Scroll divided by margins into pages



Scroll with rod

No one knows how much time elapsed, maybe centuries, before the continuous writing was divided into pages by means of margins. This was a very significant change.

The Egyptians at Alexandria had the largest library of ancient times. It is said to have consisted of over five hundred scrolls.

3. The word manuscript means "written by hand" although today we speak of typewritten manuscripts.

Until printing was invented the hand-written manuscripts were the chief records of history.

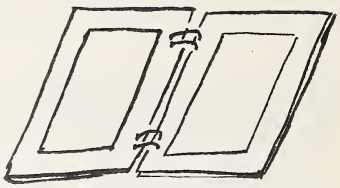
During the Middle Ages, the monks and other scribes copied many ancient classics from decaying papyrus rolls on to parchment. These manuscripts were works of art. They were beautifully ornamented, usually in red or blue, and in later years gold was often used. The illustration and ornamentation of manuscripts is called illumination.

The scribes were professional handwriters. They were able to copy many writings with ornamental design.

4. After the introduction of Christianity, the monks copied the scrolls and bound them into books. Each page was carefully and beautifully made. Initial letters and illustrations were so exquisitely made that a book might be several years in the making. In fact it took over three years to copy the Bible by hand. The covers of the books were often of carved wood or finely tooled leather.

Books remained a luxury until the introduction of larger and faster printing presses.

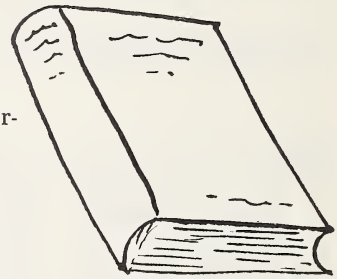
Babylonian clay tablet



Roman wax tablets hinged together with thongs

Book written by hand
Wooden covers

A modern leather-covered book



## OUR NUMBER SYSTEM

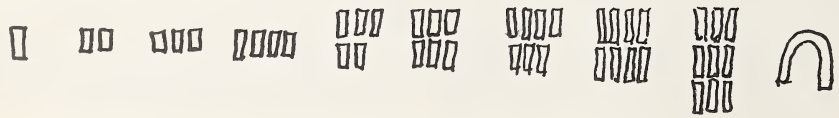
The Arabs made the first numbers. They were like this

١ ٢ ٣ ٤ ٥ ٦ ٧ ٩ ٠

The Babylonians used slightly different numbers

and so on.

These people also known as the Peoples of the Land of the Two Rivers learned to count and measure. They learned to count by ones and tens on their fingers and toes. They had a special mark for 60 which was a very high number to them. The Egyptians made their numbers in this fashion:



The Romans used letters to represent their numbers:

I II III IV V VI VII VIII IX X

Our numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 come from the Arabic numbers.

## A SAMPLE TEST

**One should be used after each problem has been covered.**

### REVIEW

1. Why did men begin to draw simple pictures?
2. Why were books expensive when monks wrote them?
3. What were the stages in the development of writing?
4. Explain why alphabets differ in different countries.

FILL IN THE BLANKS.

1. Men first talked to each other by.....
2. The first writing was in.....
3. The writing of Ancient Egypt was called.....writing.
4. Cuneiform writing was.....shaped and a.....was used on tablets.
5. The alphabet was invented by.....
6. The.....added the vowels to the alphabet.
7. The.....enabled us to translate Egyptian hieroglyphics.
8. The.....gave us our numbers.
9. The.....were the first to make paper.
10. The Egyptians used.....for paper.
11. We make paper from.....or.....
12. Ink was made from.....and.....
13. The first books were printed by.....

## STUDY OF WORDS

**Match meaning with words**

| | |
|---|---|
| nomads | —the art of giving information, ideas, etc., by speech, writing or signs |
| prehistoric | —wedge shaped |
| sign | —a local language |
| communication | —a motion to show what you mean without speaking |
| papyrus | —people who wander from place to place |
| pulp | —a writing instrument |
| dialect | —period before written history |
| parchment | —a long reed growing along the Nile and made into paper used by the Egyptians |
| stylus | —the skin of a sheep or goat prepared for writing on |
| cuneiform | —a mixture of rag or wood fibres ground up and put in water—used for paper making |

## PROBLEM II

# HOW MAN DEVISED MEANS OF PRINTING

1. Long before printing was thought of in Europe, the Chinese were using a method of block printing. On a block of wood, of the required size, they carved the words of the story. Ink was brushed over this block and then the page pressed upon it. Many copies could be printed from one block.

2. Johann Gutenberg, who was born in Mainz, Germany, received the credit for being the first to invent movable type. However, many claim that Laurenz Janszoon Coster of Haarlem, Holland had succeeded in printing from movable type several years before Gutenberg conceived the idea. Irrespective of who was first, movable type was a very important step towards a faster way of making books.

For movable type each letter of the alphabet was cut from a separate block. This type was used to spell out the words which were then placed in a frame, the size of a page. The frame was then locked so the letters could not fall. The ink was brushed on and paper pressed against it.

Johann Gutenberg, who had learned the trades of cutting and polishing precious stones and of mirror making, was the first to use metal for the movable type. His first experiments using type made first of wood, then lead, then iron were unsatisfactory. However, these failures convinced Johann that he must use a metal harder than lead but softer than iron. He finally produced a type metal, five parts of lead, four parts of antimony and one part of tin. Strangely enough, this is almost the identical mixture used to-day. Gutenberg then set about to invent tools needed for casting type. The punch, matrix and mold he invented are very similar to those still used.

3. Gutenberg's first press was very crude. It was made with a heavy upright frame of wood and stout crosspieces to hold the removable plate upon which the type rested, and a movable plate which could be raised or lowered by a screw.

Although this was a very slow process it was much quicker than block printing or copying books by hand writing.

In order to carry on his work Gutenberg had to borrow money from several sources. No sooner had Gutenberg completed the great accomplishment of printing the first Bible than trouble began. His printing plant was seized and he was turned out. His partners started up their own business but they too had trouble—the office and machinery were destroyed. The workmen from these plants found refuge in different countries and so printing craft spread throughout Western Europe.

William Caxton learned the art of printing while visiting in Cologne and set up a printing press in Westminster on his return. In 1477 he printed the first book in English. Caxton printed a great many books and translations, notable amongst them: Chaucer's Canterbury Tales and a collection of stories about King Arthur and his Knights of the Round Table.

For more than 300 years the wooden-framed upright hand press with only minor improvements was used. The Earl of Stanhope made many important improvements to this press. Finally a cylindrical press was introduced.

Frederick Koenig, a German inventor produced the first practical cylinder press. His invention was to place type on a flat bed that moved back and forth under a large pressure cylinder. Improved designs of cylinder presses soon followed, using two cylinders. It was now possible to print both sides of the sheet of paper on one machine. Later improvements and the perfecting of rotary presses were made by the Hoe family.

4. A very important step in the progress of printing was that of the invention of an amazing machine called a linotype, which was invented by Ottmar Mergenthaler of Germany.

As a result of this invention the printer did not have to set type by hand. The linotype sets a "line of type" at a time and greatly speeds up production. On the linotype machine there is a keyboard like that of a typewriter. Each line of print is typed on a small strip. These strips are put together to print newspapers, books and magazines.

5. Lithography is the process of putting a picture, design or letters on the level surface of stone or metal for the purpose of printing them.

This process was invented in 1796 by another German named Aloys Senefelder. He noticed that certain types of stones would absorb both water and oil. After drawing on the stone with an oily ink or with crayon he found that water would not be absorbed on the places touched by the oil. Water was absorbed only where the ink had not touched the stone and oily ink only adhered to the greasy ink or crayon. The wet part of the stone would not absorb the ink when a sheet of paper was pressed against the stone, but the design in ink came off on the paper. Many copies of a picture could be made in this way.

Since then zinc, stainless steel, plastics and even paper have been used instead of stone.

6. The invention of the printing press, linotype and typesetting machines and lithography have made it much easier for us to communicate. It is now possible to print books, magazines and newspapers very quickly and in great quantities. Great libraries have been established everywhere so that it is now possible for everyone to have reading material.

## NEWSPAPERS

Probably the first newspapers published were those in Peking, China. They were at first produced from the carved blocks and later copied by hand. The Tsing-Pao, a court journal, is believed to have been published as early as 500 A.D. and continued until 1935.

In early Rome newsletters were sent by the scribes to the businessmen and politicians in distant cities. The news items were tacked up on a bulletin board in the forum or public square, and later copied by hand by the scribes.

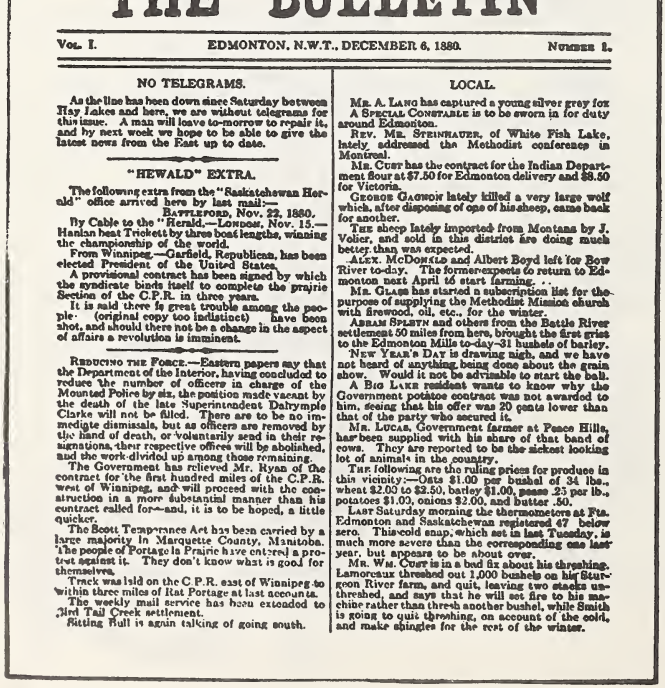
After Gutenberg's invention of printing from movable type, news pamphlets or news books were occasionally issued. These were published very occasionally as rulers frowned on the public having too much knowledge. Moreover, very few people could read. As more people learned to read there was a greater demand for news pamphlets which now started to appear in many countries.

The first English newspaper was the "Weekly News" published in London in 1622. Up to 1641, only foreign news was printed in the paper. It might be said that the town criers who gave local news were the newspapers of the English towns and villages.

The first American newspaper was published in Boston and although suppressed after the first issue it was not long before other papers were attempted and in 1704 a News Letter was started in Boston.

The early papers were too expensive for the poorer classes of people and it was not until the Penny papers were started that journalism became popular.

The first newspaper published in Alberta, "The Edmonton Bulletin", was founded by Frank Oliver in 1880.



THE BULLETIN

Vol. I. EDMONTON, N.W.T., DECEMBER 6, 1880. Number 1.

NO TELEGRAMS.

As the line has been down since Saturday between Hay Lakes and here, we are without telegrams for this issue. A man will leave to-morrow to repair it, and by next week we hope to be able to give the latest news from the East up to date.

"HEWALD" EXTRA.

The following extra from the "Saskatchewan Herald" office arrived here by last mail:—

BATTLEFORD, Nov. 22, 1880.

By Cable to the "Herald.—LONDON, Nov. 15.—Hanlan beat Trickett by three boat lengths, winning the championship of the world.

From Winnipeg.—Garfield, Republican, has been elected President of the United States.

A provisional contract has been signed by which the syndicate binds itself to complete the prairie Section of the C.P.R. in three years.

It is said there is great trouble among the people (original copy too indistinct) have been shot, and should there not be a change in the aspect of affairs a revolution is imminent.

REDUCING THE FORCE.—Eastern papers say that the Department of the Interior, having concluded to reduce the number of officers in charge of the Mounted Police by six, the position made vacant by the death of the late Superintendent Dalrymple Clarke will not be filled. There are to be no immediate dismissals, but as officers are removed by the hand of death, or voluntarily send in their resignations, their respective offices will be abolished, and the work divided up among those remaining.

The Government has relieved Mr. Ryan of the contract for the first hundred miles of the C.P.R. west of Winnipeg, and will proceed with the construction in a more substantial manner than his contract called for—and, it is to be hoped, a little quicker.

The Scott Temperance Act has been carried by a large majority in Marquette County, Manitoba. The people of Portage la Prairie have entered a protest against it. They don't know what is good for themselves.

Track was laid on the C.P.R. east of Winnipeg to within three miles of Rat Portage at last accounts.

The weekly mail service has been extended to Bird Tail Creek settlement.

Riting Hall is again talking of going south.

LOCAL.

MR. A. LANG has captured a young silver grey fox

A SPECIAL CONSTABLE is to be sworn in for duty around Edmonton.

REV. MR. STEINHAUER, of White Fish Lake, lately addressed the Methodist conference in Montreal.

MR. CUST has the contract for the Indian Department flour at $7.50 for Edmonton delivery and $8.50 for Victoria.

GEORGE GAGNON lately killed a very large wolf which, after disposing of one of his sheep, came back for another.

THE sheep lately imported from Montana by J. Voller, and sold in this district are doing much better than was expected.

ALEX. MCDONALD and Albert Boyd left for Bow River to-day. The former expects to return to Edmonton next April to start farming. . .

MR. GLASS has started a subscription list for the purpose of supplying the Methodist Mission church with firewood, oil, etc., for the winter.

ABRAM SPLETH and others from the Battle River settlement 50 miles from here, brought the first grist to the Edmonton Mills to-day—31 bushels of barley.

NEW YEAR'S DAY is drawing nigh, and we have not heard of anything being done about the grain show. Would it not be advisable to start the ball.

A BIG LAKE resident wants to know why the Government potatoe contract was not awarded to him, seeing that his offer was 20 cents lower than that of the party who secured it.

MR. LUCAS, Government farmer at Peace Hills, has been supplied with his share of that band of cows. They are reported to be the sickest looking lot of animals in the country.

THE following are the ruling prices for produce in this vicinity:—Oats $1.00 per bushel of 34 lbs., wheat $2.00 to $2.50, barley $1.00, pease .25 per lb., potatoes $1.00, onions $2.00, and butter .50.

LAST Saturday morning the thermometers at Fts. Edmonton and Saskatchewan registered 47 below zero. This cold snap, which set in last Tuesday, is much more severe than the corresponding one last year, but appears to be about over.

MR. WM. CUST is in a bad fix about his threshing. Lamoreaux threshed out 1,000 bushels on his Sturgeon River farm, and quit, leaving two stacks unthreshed, and says that he will set fire to his machine rather than thresh another bushel, while Smith is going to quit threshing, on account of the cold, and make shingles for the rest of the winter.

## PROBLEM III

# HOW MESSAGES HAVE BEEN SENT THROUGHOUT HISTORY

### A. Messages Heard

1. Drums are the oldest instruments of sound. We think that first one hard object was pounded against another, later a stick was used, while still later it was discovered that beating against a hollow tree or other object was much better. Thus very gradually various types of drums developed.

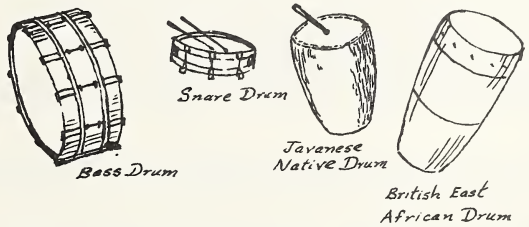
The natives of Africa, South America, and the West Indies made great use of the drum. They beat out messages to tell of death, of war, of the election of a new chief, or of any important news.

The African drum speaks in rhythms that have meanings which are readily understood by all the natives of the jungle.

The American Indian used the tom-tom or drum. The beat of his tom-tom travelled great distances and could be relayed rapidly.

European armies during the Middle Ages used drums to give signals of command during battle.

To-day drums are used to attract attention at the circus, at a parade, and at many outdoor performances. They are important in every band and orchestra.




2. Bells have been used in China for more than 4,000 years. Their bells which we call cymbals, were metal bars with clappers also of metal. They were used to announce meetings, in religious services and to give warnings.

The cup-shaped bell dates back to the fourth century. Its first use was to call Christians to worship. Since then bells have always been closely associated with religious services. They have told the news of births, weddings, deaths, invasions, and victories. Before the time of household clocks, bells were used to announce time.

In the sixth century, bells were used in France as curfew-bells, curfew meaning to "Cover fire". Later the curfew bell was used to signify the end of the day at which time all persons were expected to retire. This was designed to discourage group gatherings, which were considered dangerous. We remember such famous lines as "The curfew tolls the knell of parting day" by Gray or "Curfew must not ring to-night" by Rose Hartwick Thorpe.

The town crier and the night watchman carried a bell to tell the time or to attract attention before announcing news.

In pioneer days bells warned of Indian attacks, told of the arrival of the pedlar, or of the awaited arrival of a ship.

Bells in lighthouses and on buoys at sea warn of danger.

Bells on ships tell other ships whether to wait, move ahead or reverse. After hearing the message the second ship repeats the signal indicating that the message has been understood. Fire bells on ships give a message of alarm.

Sleigh bells, wedding bells, bells on New Year's Eve all have messages of good cheer and of hope—"Ring out the old, Ring in the new".

Bells have many more uses—they wake one up, they call children to school, they signal factory and office workers to start and to finish their day's work; they call one to the telephone: they tell when the food is cooked or when a guest has arrived.

Many bells, sets of chimes, and clarions are to-day operated by electricity.

**Famous Bells**—The Liberty Bell pealed forth the news of the signing of the Declaration of Independence.

Big Ben in Westminster Tower of the Houses of Parliament has been heard around the world by means of radio on many occasions.

Belfrey of Ghent in Belgium bears the following inscription—"My name is Roland, when I toll there is fire, and when I ring, there is victory in the land."

3. Horns and Bugles

Horns have been used since very early days, as megaphones when calling messages to people, by shepherds in the mountains of Europe, by heralds announcing important news.

Lighthouses and ships use the fog horn to warn ships at sea.

Horns are used for fox hunting in England.

Bugles mark the daily routine in the army: they awaken soldiers, mark the end of the day, call to assembly, mess and retreat. They are also used for marches and for special ceremonies.

Like the bell, the horn and bugle are used to call general attention and for distress or alarm signals.

4. Sirens and Whistles

Sirens and whistles have been used as signals of attention or of warning. They are sounded as fire alarms, air raid signals, gas explosions or for ambulances.

They tell workers that their day must start or end, or they signal a lunch break.

Postmen in Europe carried whistles to announce their arrival.

Boy Scouts and Girl Guides use whistles for special signals.

Railroads and steamships use whistles for many purposes. These signals are usually given in the dot-dash code, a short toot being a dot while a long one is a dash.

**Fog Signals**—International rules require fog signals to be sounded at intervals not exceeding two minutes.

A long blast————lasts from four to six seconds.

A short blast—is one second.

Vessels use a code to signify their position. Steamboats when stopped give one long blast followed by another long blast after one second of silence.

Vessels at anchor ring a bell for five seconds while fishing vessels signal with one long toot or ring a bell for five minutes.

From the earliest times when a person wished to communicate with others at a distance, he would go to the highest hill top or to the top of a tree or to a tower (in China such towers were specially built on the great walls) to shout the news. A sentinel hearing the shouted news would shout the message to another and thus it would be relayed until the news reached the desired destination. Often a megaphone would be used to help the sound carry further.

In ancient times special messengers were called heralds.

In Greece during the Olympic Games, heralds announced the victors while at other times they carried messages. The story of Pheidippides is a dramatic story of such a Greek runner. Often in Greece and in Rome the heralds stood in the public square to announce exciting news.

During the Middle Ages the heralds became personal messengers for kings, travelling from one country to another much as our ambassadors do to-day.

The wandering poet musician was another important carrier of news and stories during the Middle Ages. In England, these men were called minstrels, in France troubadours, and in Germany minnesinger. Many tales of adventure, mystery and romance have been sung by these minstrels. Probably the best known and loved are those of Robin Hood and of Richard the Lion Heart.

The town crier was the carrier of important local news. In the eastern United States they were heard just prior to World War I, and even today in small villages in the south of France a crier announces daily events, especially what foods are available at the local market.

To-day, the sentinel, herald, wandering minstrel and town crier have been replaced to all intents and purposes by the radio announcer. He gives the news, advertises the merchant's wares, and gives us the weather just as the town crier did in days past.

**B. Messages Seen**

1. Centuries ago messages were sent long distances by means of bonfires which were lit on tops of high hills. If there was news which many towns should know, such as enemy attacks or victories, it was told by relay fires. Each village had a pile ready on its highest hill. As soon as a fire was seen, their fire would be set alight, then the next one, and so on until the news had spread the full length of the country.

Later the bonfires were placed on high stone towers specially built for this purpose. These fires were known as beacon lights.

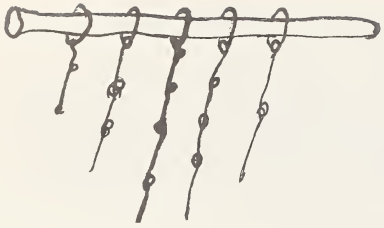
The American Indians using a system of signal fires, sent messages by night. Long or short flames produced by covering and uncovering the flame for longer or shorter periods of time, conveyed the message.

In daylight, they held a blanket over the flames. Then by quickly pulling away the blanket, they sent up puffs of smoke which could be seen for long distances. These smoke signals gave the message.

Each Indian tribe had its own code.

2. The Ancient Persians when fighting against the Greeks in the Battle of Marathon used their shields to signal to the waiting soldiers. A polished shield was set up on the top of a high hill and tilted back and forth so that it could catch and reflect the sun's rays. These are called heliograph messages. Mirrors were later used to flash beams of sunlight long distances.

Boy Scouts still send messages by heliograph.

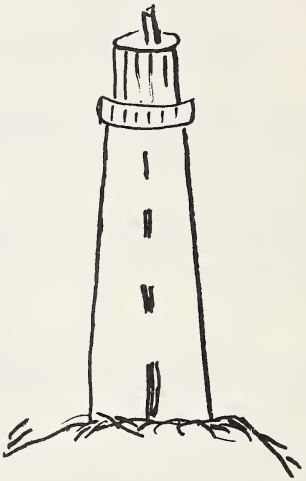


3. The Incas of Peru had a strange method of communication known as quipu, meaning "knot". Colored cords or threads of various lengths were tied to a heavier cord, and hung from it in fringelike manner. Knots were tied in each color, each knot and color having a special meaning.

4. The first lighthouses were the beacon lights burning on rocky shores of bodies of water to warn sailors of dangers. Until coal was discovered, large oak logs were used to keep these fires burning.

The first lighthouses that were built used candles for their lights. Candles were replaced by oil lamps and gas or electricity. Each lamp has a glass lens that revolves around the light. Parts of the lens are covered so that as the lens turns, light shows in flashes. Each lighthouse has its own signal in order that sailors can determine which lighthouse they are near.

Lighthouses are also equipped with fog horns. Sailors can check their position by timing the intervals between blasts. Many lighthouses have radio signals and new lighthouses are automatic. Lighthouses may be a danger sign or a signpost marking the entrance to a harbor. They act as guides.



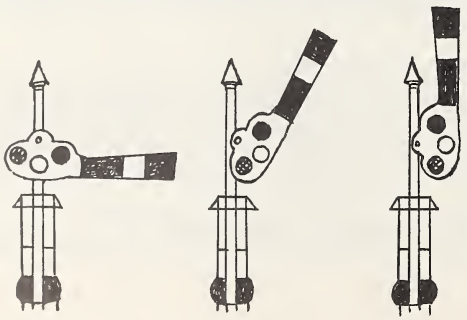
5. Flags are often used to send messages. In early days pennants were carried by knights and men in battle. Every ship carries a code book of flag signals. Signalling by flags is used between ships at sea or between ship and shore.

A flag flying upside down indicates distress. Weather flags are flown to tell sailors and fishermen about the weather—the color of the flag tells its meaning.

Semaphore is a method of signalling by the use of flags, lanterns, wooden arms, or sign-carrying apparatus.

The semaphore method of signals was invented in France by three brothers. They had been placed in different schools that were within sight of each other. Wishing to communicate with each other they invented this method of signalling.

Semaphore signals are used by railroads. They are equipped with lights for night use.



Sometimes signalling with flags is done in the semaphore code. To do this, two flags, each 18" square and divided diagonally into two triangles, one red and the other white, are used. A flag is held in each hand and the position of the flags tells the message.

If the distance between the two persons is too great one flag is used instead of two. This is known as wigwag signalling which is done by dots and dashes. The wigwag signalling is much slower than the semaphore signalling.

Persons skilled in semaphore can get the meaning very quickly.

To-day we use lights as signals. They are used on bicycles, cars, boats, trains and aeroplanes. Lights help guide pilots to airports.

Traffic lights tell us to stop, go and take care.

### C. Messages Carried by Man, Carrier-Pigeon and Vehicle

1. Since the earliest times messages have been carried by runners. In the days before man could write these runners had to learn the message from memory. As there were no roads the news might be weeks or even months on the way. When travelling a great distance the runners ran in relays. Every few miles a man would be waiting and, as soon as he heard the message, off he would dash to the next runner. Often the message would have its meaning greatly changed before it reached its destination. To help avoid this, these runners carried notched sticks as reminders of their messages. Each notch would have its own special meaning.

In North America the Iroquois used belts woven with beads or shells as their reminders. These beaded belts were called wampum.

2. The carrier-pigeon is one of the best messengers and has been used throughout the years. When taken on a trip the pigeon is able to find its way home. The messages are put in tiny cases and fastened to a leg or under the wing.

When runners travelled on roads where they might meet robbers, they always carried a basket of homing pigeons. If they were captured they released the pigeons. When the pigeon returned home other runners could be sent with the message.

3. The first messages were carried by man on foot, later messages were sent by man on horseback, since horses could travel so much faster than men. In those days, even as now, speed was one of the most important requirements in the delivery of a message.

The Roman messengers rode on horseback or in chariots. All along the way there were relay stations where fresh horses or extra chariots were stationed. The Romans had built much better roads than any other people of that time and they marked the distances by stone posts to keep track of the distance they travelled and also to help them mount or dismount.

The chariots used by the Romans were the first carts used.

Very slowly, better and faster ways of carrying messages came into use. After the cart came the stage coach, then the train, the bus, and finally the aeroplane.

With the age of electricity, and modern inventions it has been made possible for messages to be carried around the world in a matter of minutes.

## PROBLEM IV

# HOW OUR POSTAL SERVICE OPERATES

Postal Service because of its low cost and its privacy is a vital means of communication for the individual, business, industry, and government.

### 1. The Carrying of Mail in Ancient Times

(a) In Babylon runners carried important messages. These messages were written on clay tablets with the king's seal affixed.

(b) In Persia, King Darius I (558-486 B.C.) had a wonderful system of post roads, bridges and ferries. At the excellent inns built along the way, the traveller could get lodging and a change of horses.

(c) In the Roman Empire messages were carried by relay runners. Later these runners were replaced by men using their famous chariots. It is thought that Rome copied the system of the Persians but greatly improved upon it. The Roman roads were the best in the world and this fact meant that communications were good.

(d) In China, on the Gobi desert, a system of relay riders carrying official messages was established by Genghis Khan. Forty years later Kublai Khan, his grandson, built large hostelries on the same route. Over these roads relay riders passed the messages from one rider to the next without any delay of time. These riders are mentioned in the diary of Marco Polo.

(e) Pigeons have been used as carriers of messages since 1000 B.C.

### 2. Carrying of Mail in Medieval and Pioneer Times

(a) Favor Letters.

Since the earliest times it has been the custom of friends to carry letters for one another whenever they travelled. These were known as favor letters. Often these letters were months or even years on their way. The traveller would sometimes leave these letters at the general store or on a table at the inn. Anyone knowing the person to whom the letter was addressed would deliver it.

When settlements were first established in America, captains of the sailing vessels carried letters to friends and relatives across the seas. These captains, caring nothing about what happened to them after they left their hands, would leave them at the landing port of the vessel, where by chance someone might take them to their destination.

(b) Mail Services in Europe

1. In France post carriers known as the King's couriers carried mail of great importance. In the sixteenth century Francis Von Taxis of the House of Thurn and Taxis was given permission to carry private mail. However, not only were the charges prohibitive but all mail was opened and read before it was delivered. As a result of this very little private mail was carried.

2. In England the runners were replaced by messengers on horseback and finally by the post carriers in cart or coach. In the thirteenth century, King Edward IV set up a system of post horses for official mail. By the end of the seventeenth century and by the middle of the eighteenth century stagecoaches were used and regular coach mail service had been established.

(c) Mail Services in America

1. In North America the Indians carried the first messages. Later the pedlars, traders or the coureurs-de-bois brought the letters over the narrow Indian trails. After the improvement of the roads post riders carried the mail. Though the stagecoach had by this time started to carry mail the roads were often blocked by drifted snow or impassable because of mud. Men on horseback could make better time so the post riders continued to carry the mail.

2. In 1775 Benjamin Franklin was appointed the first postmaster in the American colonies. Before this time regular postal deliveries were being made between all the major cities on the Atlantic seaboard on a weekly schedule.

3. In Canada as early as 1721 mail was delivered between Montreal and Quebec. Then later Canadian service was conducted by the British Government in 1788. Rates were very high—one shilling from Toronto to Montreal—four shillings to England.

From 1851 until 1867 each province was responsible for its own mail service but with confederation the Dominion became responsible for all postal services.

4. As a result of the Gold Rush in California a need was felt for better means of communication there so in 1860 the Pony Express was organized. Relay stations were established at regular intervals. There were the way stations where the riders changed horses and the home stations where the riders changed. There were about eighty riders at one time in the Pony Express.

The mail pouch was strapped to the saddle of the horse. The rider would gallop about ten miles, change horses with the greatest speed and continue on the gallop. About every hundred miles a new rider would take over. If, for any reason, there was not a new rider available, the first rider was forced to continue. They rode regardless of the weather or danger for the mail must go through. This service only lasted about sixteen months. Many exciting stories are told about the riders of the Pony Express.

5. After the pony express came the stagecoach and later the train. At first the train only carried the mail part way and then it had to be taken by rider or by coach.

When trains first started carrying mail, the same post carrier went with the mail sacks from the beginning of the trip to the end of it.

As transportation improved so did the facilities for carrying mail. Special mail cars were built. Letters and papers were sorted during the trip by a mail clerk. No longer did the one post carrier take the mail on its complete journey. The mail car was really a small post office complete with sorting desks, big mail pouches and cancelling machines.

Mail bags were picked up and dropped when the train stopped. If the train did not stop, there were mail cranes beside the tracks, and as the train rushed by a steel hook on the mail car extended to take the mail bag. To-day mail is carried by express trains, buses, fast steamer ships and aeroplanes. The mail service has developed extensively from the days of canoe, dog team, horse and buggy to the aeroplane of today.

The early story of Canada's air mail was written by pioneer bush pilots who carried air-borne cargoes to the remote mining settlements and trading posts of Northern Canada. Trans-Atlantic and Trans-Canada flights have speeded up postal service until to-day it is possible to receive a letter in Alberta from central Europe in three days' time.

### 3. The Post Office

1. To-day carrying and distributing mail is very important. All civilized countries work together to assist in the handling of mail.

After the mail is collected from the many mail boxes it is taken to the Post Office, where the mail is stacked by the postal clerks. The letters, with the stamps in the same position, are placed face upwards on a moving belt so that an electric cancellation machine may cancel the stamps and imprint the name of the city and the date on the envelope. Many large businesses have their own franking machines which make the task of stamping large amounts of mail much easier.

The mail is sorted according to destination. The local mail is sent down a metal chute to a lower floor where it is again sorted for the various postal zones. Out-of-town mail is bundled carefully and placed in mail sacks to be taken to the railway or the airport. Mail clerks on the special mail cars of the trains continue to sort the mail for delivery at the correct stations. When the mail is put off the train it is rushed to the Post Office to be sorted for the various zones, and delivered by the postmen.

2. The Post Office has many special services:

(a) Mail may be sent by special delivery. This mail is delivered from the Post Office as soon as it arrives regardless of the time of day.

(b) Mail may be sent subject to the C.O.D. service.

(c) Mail may be registered. A record is kept of every registered article during the entire handling.

(d) Postal money orders may be purchased.

(e) The post office offers a savings bank service whereby anyone may build up a cash reserve.

(f) A "dead letter" office is maintained to care for all undelivered mail. All possible means are taken to find the recipient or sender of every lost letter.

### 4. Strange Ways Used to Deliver Mail

(a) In Holland mail is often delivered by boat because of the fact that they have many canals.

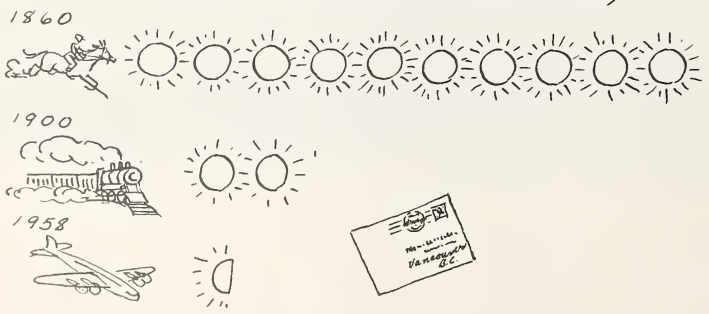
(b) In some parts of Africa camels are used. In other parts, mail is delivered in automobiles which have oversized tires to keep the car from sinking in the sand.

(c) In Alaska dog sleds or snow shoes are used.

(d) In some parts of Switzerland the mailman travels on skis.

(e) In the mountainous sections of Pakistan runners carry mail in relays. These runners wear white coats and red turbans. They carry spears with little bells that tinkle to warn off others meeting them on the narrow paths and to frighten off wild animals.

TRAVEL TIME OF A LETTER
(FROM WINNIPEG TO VANCOUVER)



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## PROBLEM V

# HOW ELECTRICITY HAS AFFECTED COMMUNICATION*

In order to begin this section we need to review briefly what electricity is and where it comes from.

To begin with all matter is made up of atoms. A drop of water contains 6,000,000,000,000,000,000,000 atoms. No-one has seen an atom but a great deal of knowledge exists concerning them.

Atoms seem to be made up of three things. Protons, which have a positive electrical charge; neutrons, which have no charge, and electrons, which have a negative charge. Protons and neutrons form a clump at the center of the atom, and the electrons revolve around this.

The completed atom does not weigh the same as the total of the individual parts did before they were brought together. Loss in weight is translated into energy.

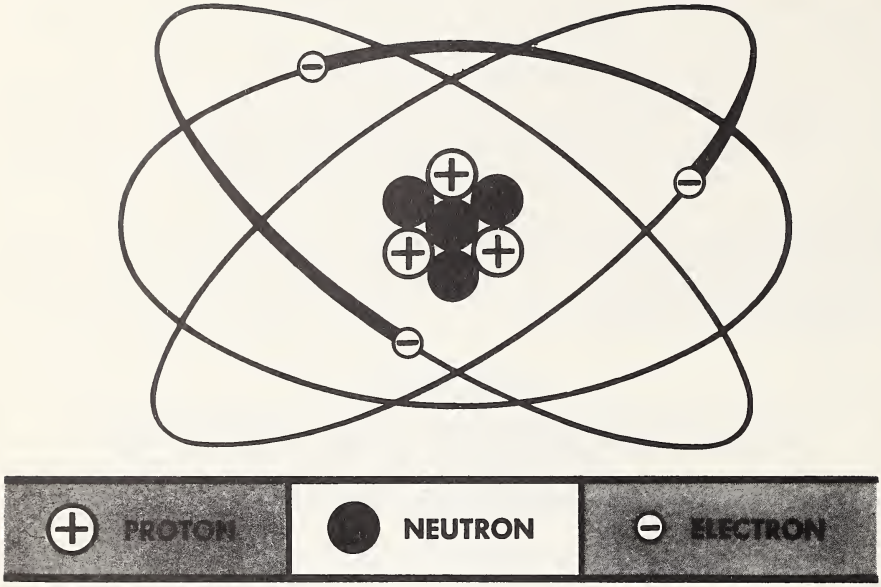
Several atoms, including uranium break easily into fragments. Uranium atoms have more protons, electrons and neutrons than any other known natural substance. If a neutron strikes the uranium atom center fission is caused. The neutron is like a trigger or match that starts the explosion. When the fragments reform into smaller atoms they release energy. Atomic energy comes then from the birth of these new atoms.

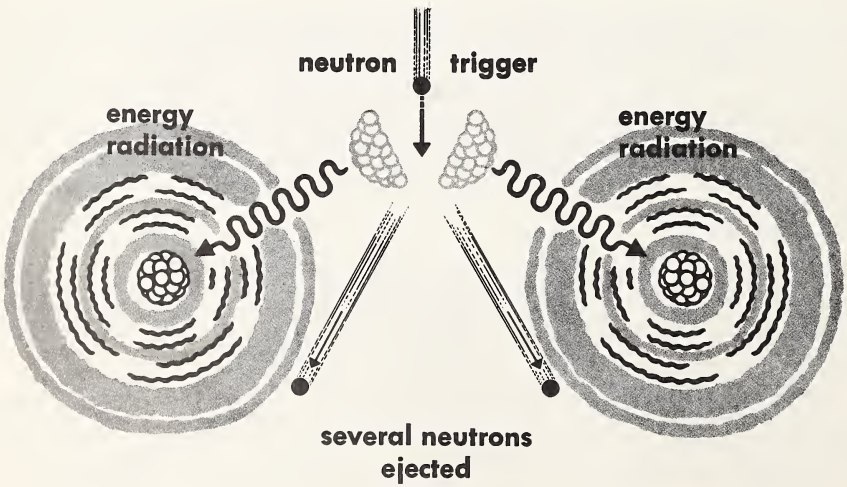
### What Is Electricity?

Electricity is the flow of electrons (the negatively charged parts of an atom) usually along a wire conductor. Electrons, which carry a negative charge, are attracted to matter with a positive charge. If something occurs to break down the atom the freed electrons will go off to some other positively charged atom. Electrons flow in waves. Electric waves travel at the rate of 186,000 miles per second.

When the electricity encounters resistance heat is generated. Some materials conduct much better than others. Silver, copper, gold and aluminum are good conductors. Rubber and glass are poor conductors. The reason for the difference between good and poor conductors is thought to be the fact that in such substances as rubber and glass the electrons are fixed rigidly to their atoms while in the metal atoms electrons move about more freely. For this reason, then, glass and rubber are used as insulators of electricity.

*The material in Grade V science outline (Energy and Machines) should be used as a guide for the study of electricity.


PROTON
NEUTRON
ELECTRON


neutron
trigger
energy radiation
energy radiation
several neutrons ejected

## Review of History of Electricity

Better means of communication depended upon electricity. As men found new ways to use electricity the art of communicating advanced.

The following are a few of the men who contributed to our knowledge of electricity and each one has his own interesting story.

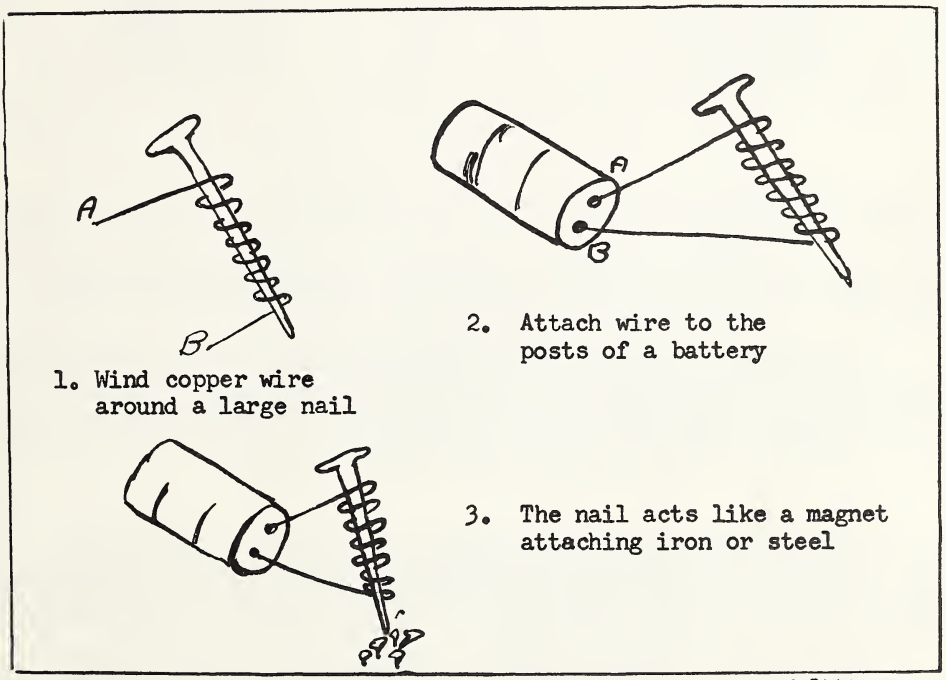
1752 Benjamin Franklin proved that lightning was electricity.
Du Fay found there are two kinds of electricity, positive and negative.
Otto von Guericke produced electricity by friction.

1799 Alexander Volta made electricity by chemical action, the first battery.

1820 Professor Oersted proved electricity in motion is magnetism, and that every conductor carrying an electric current is surrounded by a magnetic field. He proved that electricity can produce magnetism.

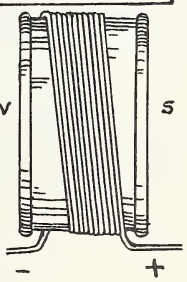
1825 Sturgeon made an electromagnet.
Joseph Henry made a strong electromagnet capable of doing work.

1831 Michael Faraday proved that magnetism can be used to produce an electric current. He also found that electricity could produce continuous motion, and thus the electric motor was devised.

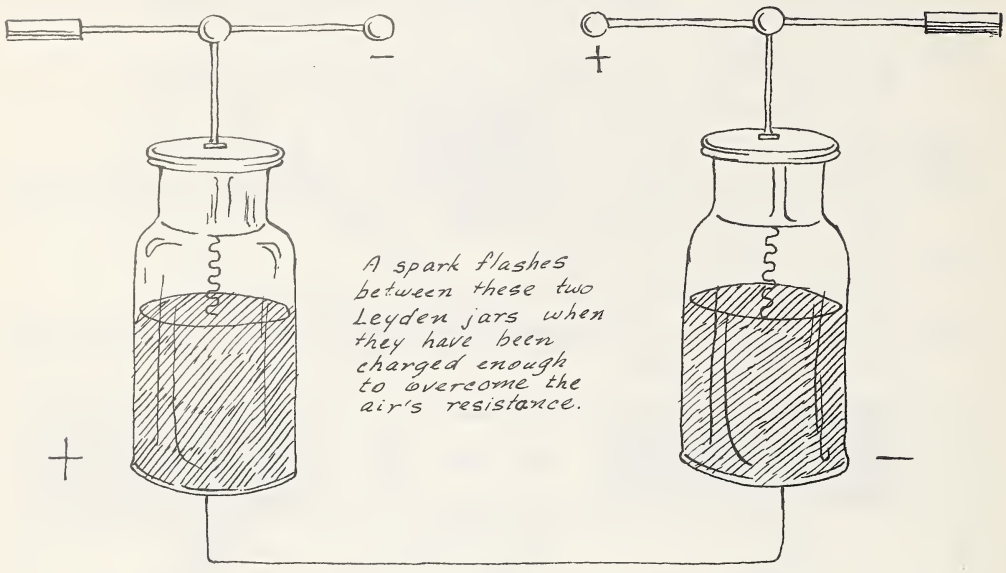



SCIENCE EXPERIMENT

1. To prove that magnetism can produce electricity. Place a wire connected to a battery near a compass. Move the wire to show that the wire draws the compass needle.
2. Make an electromagnet. Wrap a nail with copper wire connected to a battery. It will pick up small nails and filings as a permanent magnet will.



3. Turn a coil of copper wire (ends connected to a galvanometer) between poles of a magnet. The galvanometer measures the amount of electricity produced.




The Leyden jar is one of the earliest forms of condensers used to store an electric charge. It was first used in Leyden, Holland.

The jar has a cork in the opening and half of the inside and outside of the jar are coated with tinfoil. The tinfoil is a conductor of electricity. The glass between is a non-conductor.

A charge passes down the brass rod which runs through the cork and is stored in the inside tinfoil. If this stored electricity is negative (electrons) and you touch the outside of the jar grounding it, the negative electrons in the outside will be driven off (grounded) and the charge left on the outside will be positive. This charge is produced by induction. The storage capacity of the jar is increased and with a positive charge on the outside there is less tendency for the negative charge inside to leak away.

### A. The Telegraph

From the tom-toms of the African jungle to the talking wires of to-day is a wonderful story of how man has conquered time and space. Man had always wished for rapid communication but little did he dream that it would ever be possible to send messages around the world in seconds. A great many minds have contributed to this development.

When the electric battery was developed, men started experimenting with sending messages by means of electricity, but these experiments did not prove successful. However, in 1820 Hans Oersted discovered that an electric current flowing along a wire would cause a compass needle to turn.

Now many experimenters sought to use this knowledge and each added something towards the invention of the telegraph, but not until the time of Sir Charles Wheatstone and Sir William Cooke in England, and Morse in the United States, was any practical system of telegraphy devised.

### Wheatstone and Cooke

In England in 1837 a famous physicist, Sir Charles Wheatstone and his partner Sir William Cooke took out a patent on a telegraph system. Their system depended upon the ability of the current to turn a needle. Five needles were fastened to the center of a dial upon which the alphabet and numerals were printed. When the electric current generated magnetism one needle would turn to the right and one to the left. A letter would be signified where lines from the needles crossed. To send messages it took six wires, one for each needle and one to complete the electric current.

Later Wheatstone and Cooke invented a single needle telegraph. Although this system was expensive because of the many wires needed, it became used throughout England and continued in use until 1870.

### Samuel F. B. Morse

The first practical telegraph was invented by Samuel F. B. Morse, an American painter. In 1832, Morse was returning to America from Europe on the packet ship "Sully". On this trip he listened to many discussions about Joseph Henry's experiments and became inspired to send messages by electricity. He realized if he could send messages over wires, communication would greatly advance. For three years he worked, planned and experimented but without success.

He realized that the telegraph should be a recording machine, that is, that in some way the telegraph must write its message. Secondly, the main part of the machine must be an electro-magnet. When the current was on, the magnet would pull down a piece of iron to which a pencil was attached; when the current was turned off the piece of iron holding the pencil would spring away from the paper. Thirdly, it must be possible to turn the current on and off at a distance from the pencil machine and, finally, the marks made by the pencil must be made into words that could be read by anyone. For this final step Morse invented a code system. He represented letters of the alphabet by dots and dashes. This Morse code is still widely used.

Now that Morse had planned the complete idea of the telegraph he proceeded to build a machine with an electromagnet in it so he could tap out his words. His first telegraph instrument was a very crude affair constructed on a picture frame with an ordinary lead pencil suspended by a pendulum to make dots and dashes.

Morse's first demonstration was to a group of friends in his rooms at the university in New York. Fortunately, among those present was Alfred Vail. He was keenly interested in the experiment and became Morse's partner, providing much needed money for the building of new and better instruments.

It was Vail who did most of the work on the receiving instrument. It would click sharply when the current was turned on and again when the current was turned off. If the two clicks were close together it was a dot, but if the clicks were farther apart it was a dash.

### Success at Last!

For years Morse worked, making changes, improving and adding to his telegraph. Although his telegraph worked, the public showed no interest in it. He tried again and again to get Congress to appropriate money for an experimental line. Members of the Congress called it a crazy scheme so it was ten years before any assistance was given to him.

The first telegraph wire was on poles between Washington and Baltimore, a distance of forty miles. Miss Annie Ellsworth prepared the first telegram, "What God hath wrought", to be sent over wires.

### Improvements in Telegraphy

Since Morse's first telegraph many improvements have been made. At first only one message could be sent over a single wire. Later messages could be sent in both directions over one wire at the same time. Thomas Edison invented a system by which four messages could be sent. To-day it is possible to send many messages in both directions over a single wire simultaneously.

Now Morse discovered that when electric waves were sent over a wire they would jump an empty space, travelling through the air until they came to another wire. The result of this discovery was wireless telegraphy.

Another very important step in the progress of telegraphy was also made by Thomas Edison—that was to send messages to a moving train by wireless telegraph. The greatest problem of early railroads was to avoid wrecks caused by trains travelling on the same tracks. No one, except the engineer, knew the whereabouts of a train once it left a station. Now trains could be controlled from central offices far away, so they could be run safely.

### Modern Telegraphy

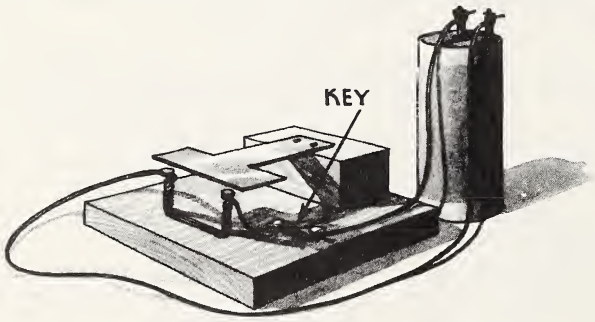
To-day the telegraph key and sounder are seldom used in sending telegram messages. Instead the teletype or teleprinter machines are used.

The message is typewritten on the machine in the first office and this sends electrical impulses directly to a receiving machine in an office at the other end of the wire. The receiving machine automatically typewrites the message on long ribbons of gummed paper. This is cut and pasted on a telegraph form.

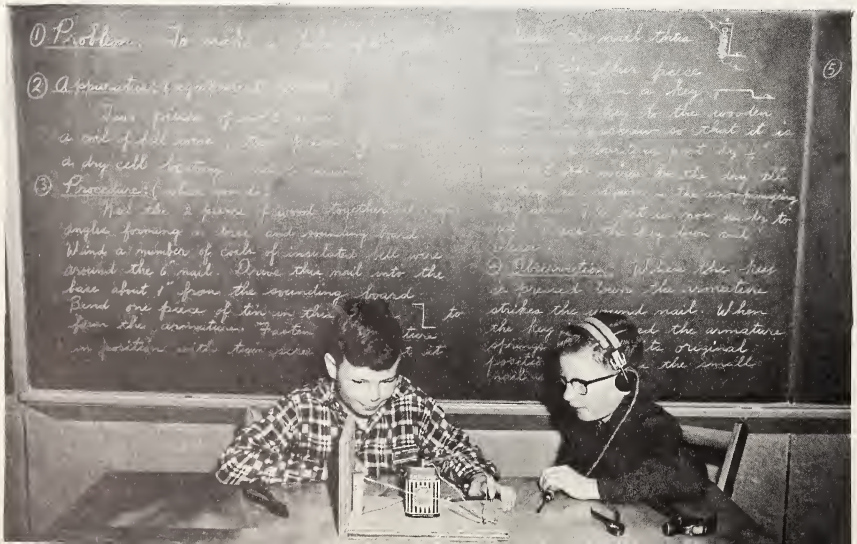
Telephotography, the art of transmitting pictures by wire, is another important means of bringing pictures quickly to all parts of the world.

### Construction of a Telegraph

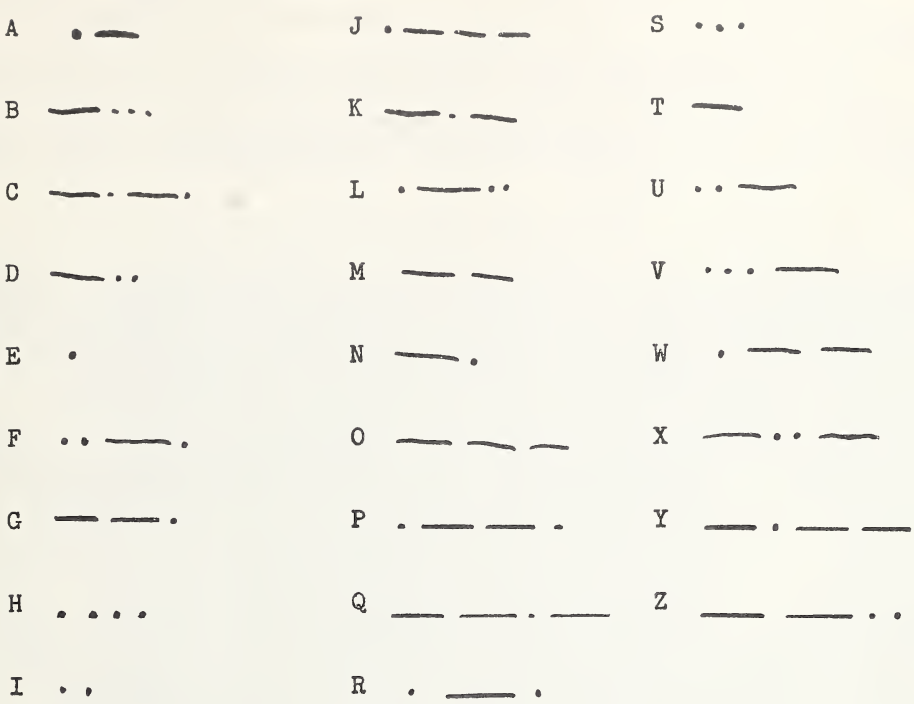
Take a small square board, a block of wood, a thin T strip of iron (metal from a tin can would do), two thumb tacks, two iron nails, a short strip of copper or brass, some light insulated copper wire and a dry cell battery. Assemble them as below.




When you press the copper wire (Key) on the thumb tack the current flows over the wire to the nails which have the wire wrapped around them. An electro-magnet is made. The T-strip of iron clicks against the nails. As soon as you raise the key the T springs away from the nails.



## THE MORSE CODE




### B. The Cable

No sooner had man accomplished the feat of sending messages over wires to distant places than he attempted to find a way to send messages across the ocean. Messages could not cross the ocean on telegraph wires strung from one pole to another: they must travel on bundles of wires called cables lying on the bottom of the ocean.

1. Samuel Morse was among the first to experiment with under-water telegraphy.

He had two miles of copper wire covered with tar, pitch, and rubber. He then placed it from New York to Governor's Island. Although a sound carried along the wire when they finished placing it, during the demonstration on the following day there was no sound at all. According to the story the cable had been cut by sailors who had raised it with their anchor. Morse was greatly disappointed with his failure.

2. New Coating for Cables

In 1845 a cable was laid across the English Channel, but as soon as the rubber coating rotted the cable ceased to work. A new covering had to be found. After much experimenting it was found that gutta-percha, the dried juice of an East Indian tree, would make a permanent waterproof coating.

In 1851 a permanent cable, complete with new coating, connected France to England.

3. The Atlantic Cable

Men now began to think of a submarine cable connecting America and Europe.

The idea was scoffed at, but Cyrus W. Field, a successful New York businessman became interested in the project. He was sure that it was possible and could be done.

A company was organized, but first the ocean bed must be sounded to find the best location for the cable. It was decided that the cable should go from Ireland to Newfoundland.

Although the first attempt, made in 1857, failed it was not long before Field was trying again. This time the cable, miles of it, was loaded on to two boats and taken to mid-Atlantic. Here the cable from both vessels was spliced together and the ships separated. They had only travelled about two hundred miles when the cable broke. They grappled for it, spliced it and once more separated only to have it break again. Disappointed, the attempt was given up.

The following year a cable was successfully laid and on August 16, 1858, the first telegraphic message was sent from Queen Victoria to President Buchanan of the United States. Unfortunately the success of the cable was short lived, as it lasted for only a few weeks.

Cyrus W. Field refused to be discouraged. He organized a new company and after many more attempts in 1866 was successful in laying another cable across the Atlantic Ocean. Now messages could be sent back and forth between Europe and America.

Not content with one Atlantic cable, the cable which had broken the previous year was retrieved, spliced and successfully laid. Both cables worked effectively.

Today there are more than 200,000 miles of submarine cable enabling men to send messages around the world. Another great step had been taken in speeding communication and conquering distance.

### C. The Telephone

The next step in the advancement of communication was the invention of the telephone by Alexander Graham Bell.

Bell, a teacher in a deaf school and an expert in the field of speech, became very interested in electrical communication. He had noticed that a note sounded close to the strings of a piano vibrated on the string of the instrument and so wondered if messages could be sent over a wire.

Before progressing with his invention Bell realized he must make a complete study of electricity. After much experimenting he decided that if he could make a current of electricity vary in intensity precisely as the air varies in density he could transmit speech by telegraph. He and his assistant Mr. Thomas Watson experimented for many months. They developed a mouthpiece with a diaphragm and fastened to it were wires and an electromagnet. At the other end of the wires was another mouthpiece. Many changes had to be made in this apparatus. The final step came as a result of an accident—one part of the apparatus did not function as planned but it allowed a sound to be heard. After several more months of hard work Bell's voice saying, "Mr. Watson, come here I want you" was heard in the next room.

The machine worked, his voice had been carried along the wire by electricity. This was in 1876.

#### Improving the Telephone

The telephones of to-day are very different from the box-like telephone made by Bell.

The first telephones were rented out in pairs and conversation could only take place between the two having that pair. There was no intercommunication between pairs of telephones.

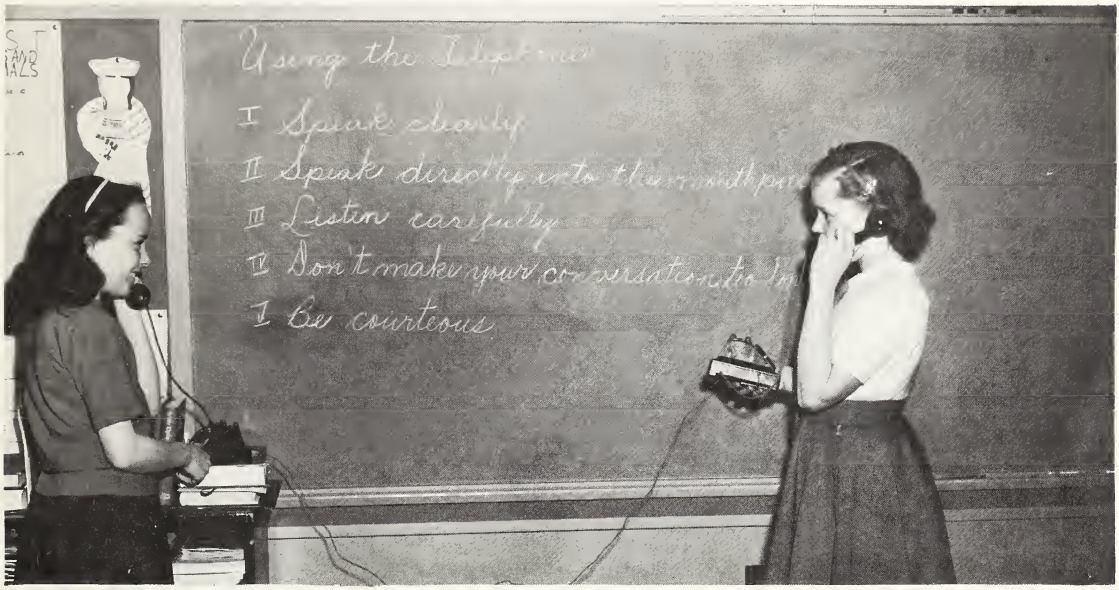
In 1878, the first switchboard was installed, but one had to grind a little crank to call the operator. It is no longer necessary to shout into the mouthpiece because of the carbon granules that have been placed just behind the diaphragm. These make the current along the wire stronger and weaker in accordance with the sound vibration.

The receiver is now different from the mouth-piece and no longer does each household with a telephone have to have a battery to provide the current—all controls are located in a central office.

The slight electric pressure in the telephone wires was not strong enough to carry the impulses long distances. To remedy this, relays and boosters were invented. At points where the current was becoming weak a booster was installed and the current became strong again. This improvement meant that telephone wires could become longer.

The first trans-continental telephone conversation took place in 1915, when Mr. Bell, in New York once again said, "Mr. Watson, come here, I want you." to Mr. Watson who, this time, was in San Francisco.

Very gradually these and many other improvements were made until to-day we have the dial phone and the automatic exchange.




**Trans-Atlantic Telephones**

The first conversation by wire and wireless from land to a ship 400 miles at sea took place in 1922.

In 1927 the first transoceanic telephone conversation was heard. This was made possible by connecting the telephone with the wireless telephone.

On September 25, 1956, man made another achievement in communication by telephone when new trans-Atlantic telephone cables went into operation. This was made possible by the use of repeaters specially developed by the Bell Laboratories. The repeater is an electronic device that boosts the voice as it starts to fade. These repeaters, eight feet long and only one and three-fourths inches thick, are affixed to a submarine cable, repeaters being spaced about every forty miles.

Cables used for this purpose have to be flexible enough to unwind from a drum and yet durable enough to last twenty years or so on the ocean floor without attention. Each submarine cable consists of a core of copper wire which can transmit up to thirty-six voices at a time. Besides the thick coating of waterproof plastic about the core there are two copper wrappings, one of them serving as a return conductor of electric current and the other intended to thwart the teredo, a marine worm. Several layers of jute and steel wire protect the cables from other sources of damage.

The route followed by the telephone cables carefully avoids the twenty or more telegraph cables that cross the Atlantic. It also avoids, as far as possible, the more popular fishing grounds.

These new cables are designed to carry about three times as many calls as can be transmitted through air. Another goal of these cables is to avoid disruption of service caused by sunspots, the aurora borealis, and other disturbances.

### The Micro-Wave

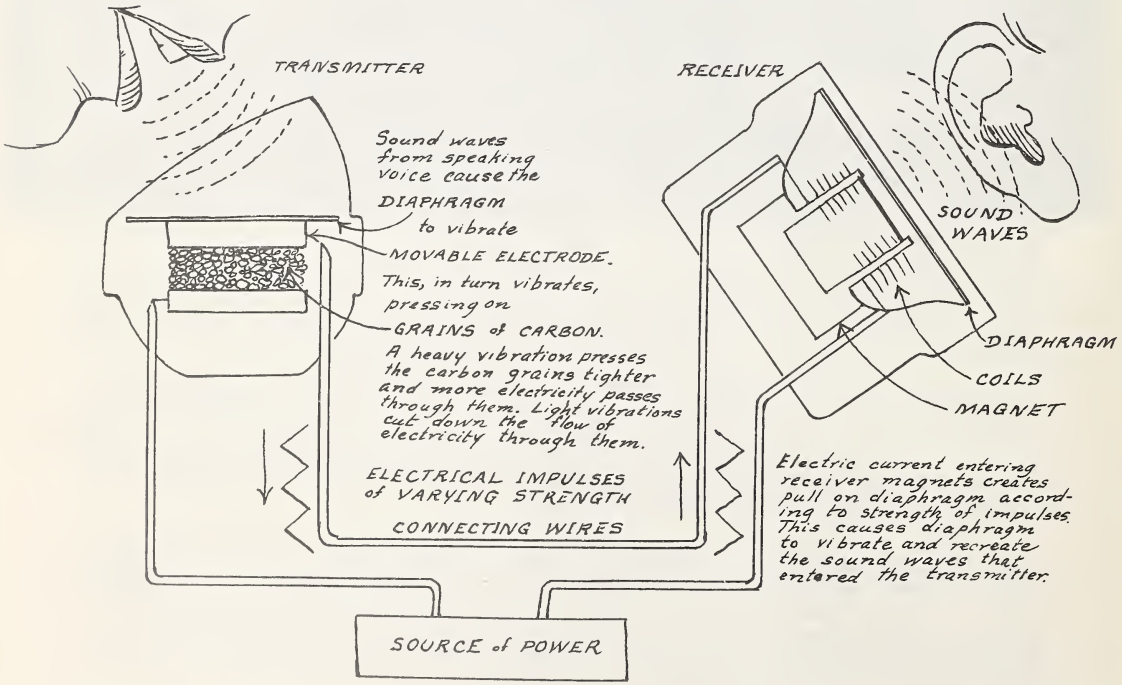
The micro-wave is probably the greatest invention improving speed and multiplicity in communication. Very high towers are being built, twenty-five to thirty miles apart and will carry long distance telephone calls and television network programmes. With the aid of micro-wave long distance calls will be made as simply as local calls.

### Directions for Making a Tin-Can Telephone

Materials needed: 2 tins open at one end
2 large nails
1 long piece of fine single strand wire

Method: Bore a hole in the can. Push ends of wire through the holes and fasten to the nail on the inside of the cans. Keep wire tight and speak loudly into one can—while the listener uses the other can as the receiver.

### How The Telephone Works



1. The air is set in motion by the sound of the voice.
2. The transmitter has an eardrum or diaphragm which is set in vibration by the movement of the air molecules.
3. Back of the diaphragm is a small chamber partly filled with grains of carbon (grains of roasted coal). Through this carbon chamber and the connecting wires a battery sends an electric current.
4. The electric current passes along the copper wire.
5. The receiver has a coil of wire wound on a magnet and an iron diaphragm. The magnet attracts the iron diaphragm drawing it slightly towards the magnet. The stronger the magnet pulls, the more the iron bows towards it but if the pull decreases, the iron flies back. The motion of the diaphragm of the receiver is just the same as that of the diaphragm of the distant transmitter. The air molecules are set in motion by the receiver and these vibrations reach the car drum.

T H E  W O R L D  I S  S M A L L E R

because of


T H E S E  I N V E N T O R S

| | | | |
|---|---|---|---|
| Wireless - | Maxwell | - Scotland | 1856 |
| | Hertz | - Germany | 1887 |
| | Marconi | - Italy | 1896 |
| Radio - | Fessenden | - Canada | 1906 |
| | Fleming | - England | 1904 |
| | DeForest | - America | 1906 |
| | Armstrong | - America | 1912 |

## D. The Wireless

The sending of messages through space without wires was not the invention of one man but the result of the study and work of many men throughout many years.

Before Guglielmo Marconi's time four important discoveries with respect to electrical energy had been made:

1. Electrical waves may be made by an electric current jumping a gap in a wire.
2. Electrical waves travel as fast as light.
3. Electrical waves travel in every direction through the earth, water and air.
4. Electrical waves sent out from one wire or aerial set up vibrations in distant aerials.

Heinrich Hertz of Germany and James Maxwell, a Scotsman, discovered electromagnetic waves, a kind of invisible light travelling through space at speeds of about 186,000 miles per second which is the speeed of light. Electrical waves travelling at lower speeds give us heat and electricity. In 1887 Hertz proved the existence of these waves when he was able to cause a spark to jump across two terminals at some distance from a sparking source, but unconnected by wires. This first signal was only sent across a room but he found that the waves moved out from the sparking source in every direction. The wave motion can be compared to the waves started on a quiet pool of water disturbed by a stone. The waves keep going outward in all directions until their force is used up.

Marconi read of these experiments and developed the first practical application of the Hertzen wave principle. Working on the knowledge discovered by Morse, Bell, Edison and Trowbridge, Marconi experimented in sending signals greater and greater distances. Using more and more powerful equipment to start the waves these distances gradually increased. First one mile in 1895, then twelve miles in 1898, then from shore to ship, then between ships at sea and finally between continents. In 1901, Marconi and his assistant Mr. Kemp were waiting in Newfoundland hoping to hear a signal from England. When the earphones said "dit, dit, dit" or "S", Marconi could not believe his ears and passed the earphones to Mr. Kemp saying "Can you hear anything, Mr. Kemp?" Mr. Kemp heard the signal that was later to save lives at sea, send messages to the far north and bring us all the wonders of radio as we know them to-day.

## E. The Radio

Radio, as we know it to-day, is only about thirty-five years old and many scientists have worked long and hard since Marconi's first success in sending messages long distances through space.

The oscillator or spark coil that Marconi used could only send messages in telegraph code. To send waves out that will broadcast the voice and music the vibrator that causes waves similar to those caused by a splash in the pool must vibrate from ten thousand to several million times a second. The next inventors built oscillators that would send alternating currents steadily at these high speeds. These radio waves are produced by oscillations or vibrations of electric current in a tube or bulb now called a vacuum tube or valve. The first broadcast from a radio station using this idea for transmitting took place from Pittsburgh in 1920.

Now we will go back to the time of Marconi and consider some of the discoveries in this twenty-year period. The first period after Marconi's success was devoted to finding a method of transmitting the voice. About 1900 Fessenden, a Canadian, using a powerful mechanical, rather than electron transmitter sent messages several miles. In 1906 his voice was heard by operators who were expecting dot-dash signals in their earphones. This was radio telephony and was the first authentic broadcast of the human voice by wireless waves.

About this time Marconi's chief engineer, an Englishman, Fleming, made use of one of Edison's many inventions. Fleming found that an incandescent lamp with a metal cylinder around the filament could be used to detect wireless telegraph signals. He called this tube a valve.

This invention was further improved by an American, Deforest. Deforest introduced a tiny metal grid into Fleming's tube which amplified weak sounds. It is considered to be an invention as great as radio itself. In 1910 voices were carried two hundred miles by the radiophone. In the war of 1914-18 both the Germans and the Allies used the vacuum tube as a receiver. But a new way of sending messages had to be found because each side could tune in on the messages of the other.

In 1912 an American, Armstrong, found the small tube could be used to send signals of very high frequency. Without changing the tube very much he developed a generator of alternating current, alternating back and forth hundreds of thousands of times per second. Vibrations, sent into an antenna or aerial sent electro-magnetic waves into space. These high frequency oscillations could be easily modulated or changed by the sounds of the voice. Before the end of the war wireless messages by voice were both sent and received over short distances from aeroplanes. By 1921 the radio telephone was used in aeroplanes up to one hundred miles distant from the transmitter.

This wonderful tube, sometimes called an electron tube, also can act as an amplifier of feeble electric current. When used this way speech and music received in the aerial are magnified and heard through a speaker instead of the old fashioned earphones.

Armstrong and other scientists improved on Deforest's discovery and found that the vacuum tube could: send and receive messages; soften sounds or make them louder; and send waves out into space over a great range of frequencies. As a result the standard radio broadcast band which developed has a frequency range from 550,000 cycles to as much as 1,600,000 cycles every second.

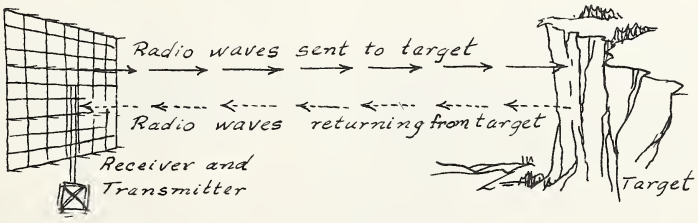
### F. Radar and Television

The discoveries mentioned under radio, made during the turn of the century, were important because they involve the fundamental principles upon which radio, television, and radar were developed.

It is difficult to give credit for these later inventions to any one person. Scientists of many countries have worked together, sharing information and discoveries, and one might say that television and radar "jus grow'd" from the beginnings made earlier. There are engineers and scientists who have worked on these ideas for thirty years in the research laboratories of large companies. Many groups, even now, are working on the same problem at the same time.

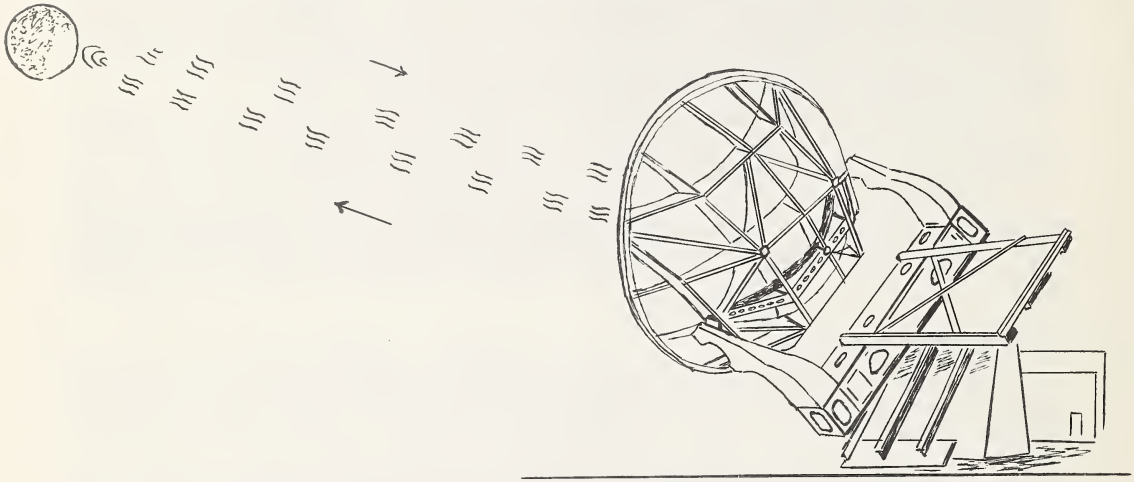
Radar is a word composed of "ra" for "radio", "d" for "direction", "a" for "and", "r" for "ranging".

The use of high frequency radio waves to locate and identify objects by reflection, similar to the echo effect of sound waves, is called radar. This use of radio waves was first developed in 1922 at the United States Naval Research Laboratory by Dr. A. H. Taylor and Mr. L. C. Young. All of the radio industries of America, Britain and Canada worked to perfect radar at the time of the Second Great War. From the Canadian National Research Council came Asdic—anti-submarine detector. This detector is based on the principle of reflected sound waves, which after being radiated out from the transmitter, echo from the hull of a submarine or any other submerged object and are received by the detector. Direction and distance can be calculated by comparing the time between the sound and the echo with the speed of sound through water.



In Britain Sir Robert Alexander Watson-Watts invented the radio-location device which could track down thunderstorms and other objects in the sky. During the critical days of the "blitz" the British were able to locate oncoming waves of German fighters and bombers. Sir Robert Watson-Watts' invention undoubtedly played a great part in saving Britain from complete devastation.

Later radar was used for many varied purposes, for instance to make gunfire more accurate, to keep ships together at sea, to locate downed aircraft, to aid navigation and the movement of aircraft in bad weather, to track the courses of typhoons and tornadoes, to penetrate cloud or fog, to locate land masses, cities, etc.



## G. Television

Television means seeing at a distance. Pictures have been sent by wire or radio for years. Radio is the reproduction of sound, and television is the reproduction of light. Radio-broadcasting and television-brodcasting is called telecasting.

When sending pictures on radio waves a transmitter called a photo-electric cell and a process called scanning are used. A picture to be transmitted is scanned by an exploring spot which, starting at the top, moves in straight lines over the entire picture. In telephotographic newspaper service the scanning of a single picture takes from ten to twenty minutes. However, in television, thirty distinct and separate pictures are scanned and transmitted every second of the time. The scene, or picture, is then broken up into thousands of spots. The photocell changes these spots into currents that carry the pattern of light and shade. A strong current flows in the cell when a lot of light is reflected back into the cell from a white surface. No current flows when the light strikes a dark surface. The receiver in the home changes the current back into light in the right order and quantity. These separate pictures are flashed on the viewing scene one after the other so fast that our eyes are deceived. Just as in moving pictures the motion seen is smooth and continuous.

In television to-day we use an electronic scanner, called a televisor, to send the picture, and a receiver called a kinescope or picture tube. These have been developed and improved by the Radio Corporation of America, and the Farnsworth Television and Radio Corporation. These companies were formed by Farnsworth, an American, and Zwaryken, a Russian who came to America in 1919. Until the time of their inventions, about 1926, improvements in television were very slow.

The initial invention which set off the development of television was the Crookes tube produced in 1878 by Sir William Crookes. This tube gave us the cathode rays formed when electrons strike the glass of the tube.

The scanning device of the television does to the light waves what the microphone of radio does to sound waves. Instead of the carrier wave being modulated by voice current due to sound waves it is modulated by the video current from the light of a picture image in the televisor. The television receiver is similar to the radio receiver. The picture tube or kinescope is a large vacuum tube comparable to the loud speaker of the radio. The video signal is changed to a picture in this picture tube.

Very high-frequency radio waves are needed in television. These waves travel in a straight line and programs can be received only between the transmitter and the point where the waves hit the earth. Since the earth is round this range is only about fifty miles. The trouble is being overcome by the use of special coaxial cables and micro-wave towers located on high points across the country to carry the programs. Motion pictures record many programs and these are telecast from local stations for our enjoyment.

## OTHER INVENTIONS

The camera, the typewriter and the phonograph are important links in the long chain of communication. The first cameras were large, strange-looking machines and the photographs they produced were printed on copper and then later on tin. The photographs reproduced on tin were invented by Louis Daguerre in 1839 and were known as tin-types. Later, such men as James Clark Maxwell and George Eastman did much in the improvement of the camera until to-day we have modern cameras with their many attachments.

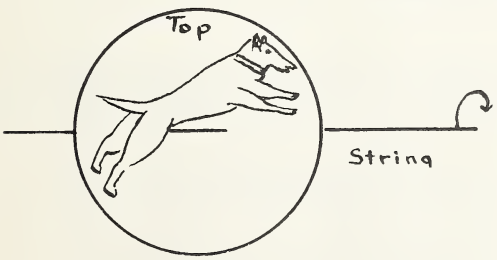
About the same time as the camera was becoming popular another kind of communication came into use—the typewriter. Before this invention everything was handwritten. The typewriter, too, has undergone a great many changes. The first patent was taken out by an English engineer named Mills in 1714. However, this model was not practical. In 1867, Christopher Latham Sholes, Carlos Glidden and Soulé of Milwaukee, Wis., developed the first practical typewriter on the market. The modern electric typewriter is very different from that early model.

Thomas Edison made the first phonograph which he called a talking machine. Like other inventions it has undergone many improvements which have helped to advance communication.

## MOVING PICTURES

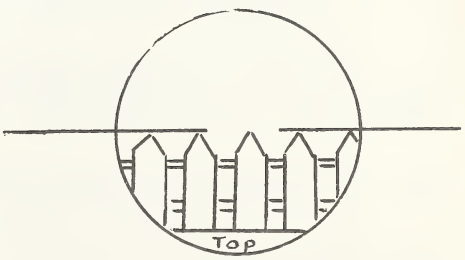
When you whirl a sparkler and see a continuous color you are experiencing a fact about vision that was first known to the Greeks and Romans.

Fig. 1




Sketch dog as shown on a 3" card board disk. On the other side draw a fence as shown in Fig. 2

Fig. 2




Hold the ends of the string in position shown in Fig. 1. Rotate the string as shown by arrow. When the string is drawn tight the disk will turn back toward you. The dog will be seen jumping over the fence.

This fact and photography were not combined to give us moving pictures until about fifty years ago. However, up to this time, many inventors made machines that showed single pictures in apparent motion. These would appear like toys to us to-day, but at that time were regarded as amazing. All of these devices used a process whereby single pictures were drawn on separate pages to represent a series of successive actions, such as occur in walking. When the pages are thumbed rapidly the subject appears to move. This was first patented in 1868 and was called a kinegraph. When photographs were used instead of drawings this device was called a kinetoscope. Edison invented the kinetoscope in 1893 and also a machine for taking photographs on film called a kinetograph. Both of these machines used roll films invented by Eastman in 1889. Perhaps you have seen a kinetoscope at a fair. Only one person can look through the "peephole" at a time. The film in the machine is moving past the eyepiece or "peephole" at the rate of sixteen frames or single pictures per second. The eye cannot adjust itself to this fast change and we see the action as continuous. In the experiment that showed this to be true twenty-four different cameras were set up along the side of a race track. A horse running down the track triggered each shutter and the single pictures obtained were the first accurate record of movement. This took place in 1872. In movie cameras of to-day the film is passed in front of the shutter at varying rates but the common rate is sixteen to twenty-four frames per second.

Many inventors in different countries now worked on the problem of projecting motion pictures so that many people could see them at the same time. A projector was finally invented in 1894 and similar machines developed by the French and the Americans were used to show motion pictures to the public in 1896. The first story film was "The Great Train Robbery" filmed in 1903. These were the days of silent movies.

Research organizations of large companies developed a kind of talking picture. They used the phonograph, invented by Edison, and the record was operated in time with the film being projected. The two machines could get out of time, producing amusing results. This talkie was called the vitaphone.

About 1927 the sound track was placed on the edge of the film and music or words and the pictures could not get out of "step". This type of moving picture was called the movietone. The electron tube that is used to pick up the light shining through the sound track is called a photo-electric cell. When you examine a sound track you see light and dark bands. A current is created in the cell according to the amount of light that shines through the track. This current of electricity is changed back to sound by amplifiers and loud speakers. Of course the sound and photography of these first pictures has been greatly improved in the past thirty years. Improvements in methods of manufacturing film and the equipment to operate moving pictures, cameras and projectors has made possible movies at home and in school.

## THE PAPER THAT TALKED

### A Story for Motivation

Once upon a time a little black boy lived with his mother, father, brothers and sisters in the heart of the jungle. Little Black Sambo and his brothers and sisters played happily all day long. They climbed the palm trees, ate the coconuts and bananas, chased monkeys and even helped their father hunt wild animals.

But one day a white man came to the jungle. Now Sambo had never seen a white man before and he was very unhappy when the white man took him away from his home. The white man took Sambo on a big ship which sailed for many days across the water.

Sambo thought he would never see land again, but finally they came to land. When they left the ship Sambo was taken to a big wooden house where he was to stay.

How different everything was! Poor Sambo! He didn't like this new life. Everything was so strange.

As time went on Sambo became accustomed to this new way of living. He learned many things and did much work for his mistress.

One day his mistress gave him a big basket and a little piece of paper to take to his master.

Sambo walked a short way but something smelled so good, he just couldn't help peeking into the basket. "M'm", there were several roast chickens. The master couldn't eat all of them and he would never know if Sambo ate just one. So Sambo sat down by the side of the road and ate one.

Whistling cheerily Sambo went on his way to his master's. When he gave the piece of paper and the basket to his master, the master read the paper and then looked into the basket. He looked at the paper again and said: "But where's the other chicken, Sambo? There are only two here. Where is the other one?"

Poor Sambo! He was surprised! How could the master know one was missing? Had that little piece of paper seen him? Could paper talk?

Sambo decided to be more careful so the next time he was sent with his master's dinner he very carefully hid the piece of paper under a big stone before he ate a chicken. The paper wouldn't be able to see him this time. After he had finished Sambo took the paper from its hiding place and went on his way singing merrily.

But that mysterious little piece of paper must be magic, for even when it was hidden under that big stone it knew that Sambo had eaten one of the master's chickens and told on him. How everyone scolded Sambo. Poor Sambo scratched his head and wondered how they knew. Maybe that paper did talk.

For a long time Sambo didn't realize that the paper had a message from the mistress to his master. One day, however, Sambo learned to read. Things were different from then on. No longer was Little Black Sambo an ignorant boy from the jungle. When Sambo grew up he wrote letters and messages himself, and he often laughed at how he thought that the paper had tricked him.

### Train Talk

1. Toot (.) means stop.
   To-o-o-t, to-o-o-t (- -) release brakes go ahead.
   To-o-o-t, to-o-o-t, toot, toot (- - . .) approaching public crossing.
   To-o-o-o-o-o-o-ot (--------) approaching stations.
   To-o-o-o-ot, to-o-o-o-ot to-o-o-o-ot to-o-o-o-ot (- - - -) flagman return from west to south.

2. Toot toot (. .) answer to any signal not otherwise provided.
   Toot toot toot (. . .) when train is starting to back up.
   When running to stop at next passenger station.
   Toot toot toot toot (. . . .) call for signals.
   Toot toot to-o-o-o-ot (. . -) approaching meeting or waiting points of trains.

A number of short toots is an alarm for persons or livestock on the track.

### Steamer Talk

Red light—means port
Green light—means starboard
"When both lights you see ahead
 Port your helm and show your red."
For vessels in sight of each other
One long blast (------)—means alter course to starboard helm to port
"If one whistle you should blow
 To starboard then your bow must go.
 And speeding across the tide
 She'll pass to port along your side."
Vessels coming towards each other from opposite directions
"If two whistles you should blow,
 Why then to port your bow must go.
 And if the space is fair and wide,
 You'll pass along her starboard side."

# Poems Concerning Communication

## THE BELLS

**By Edgar Allan Poe**

Hear the sledges with the bells—Silver bells!
What a world of merriment their merriment foretells!
How they tinkle, tinkle, tinkle,
In the icy air of night!
While the stars that oversprinkle
All the heavens, seem to twinkle
With a crystalline delight;
Keeping time, time, time,
In a sort of Runic rhyme,
In the tintinnabulation that so musically wells
From the bells, bells, bells
From the jingling and the tinkling of the bells.

## "HOW THEY BROUGHT THE GOOD NEWS FROM GHENT TO AIX"

**By Robert Browning**

I sprang to the stirrup, and Joris, and he;
I galloped, Dirck galloped, we galloped all three;
"Good speed!" cried the watch, as the gate-bolts undrew;
"Speed!" echoed the wall to us galloping through;
Behind shut the postern, the lights sank to rest,
And into the midnight we galloped abreast.

Not a word to each other; we kept the great pace
Neck by neck, stride by stride, never changing our place;
I turned in my saddle and made its girths tight,
Then shortened each stirrup, and set the pique right,
Rebuckled the cheek-strap, chained slacker the bit,
Nor galloped less steadily Roland a whit.

'Twas moonset at starting; but while we drew near
Lokeren, the cocks crew and twilight dawned clear;
At Boom, a great yellow star came out to see;
At Düffeld, 'twas morning as plain as could be
And from Mecheln church-steeple we heard the half-chime,
So, Joris, broke silence with, "Yet there is time!"

At Aershot, up leaped of a sudden the sun,
And against him the cattle stood black every one,
To stare thro' the mist at us galloping past,
And I saw my stout galloper Roland at last,
With resolute shoulders, each butting away
The haze, as some bluff river headland its spray:

And his low head and crest, just one sharp ear bent back
For my voice, and the other pricked out on his track;
And one eye's black intelligence,—ever that glance
O'er its white edge at me, his own master, askance!
And the thick heavy spume-flakes which aye and anon
His fierce lips shook upwards in galloping on.

By Hasselt, Dirck groaned; and cried Joris, "Stay spur!"
Your Roos galloped bravely, the fault's not in her.
We'll remember at Aix"—for one heard the quick wheeze
Of her chest, saw the stretched neck and staggering knees,
And sunk tail, and horrible heave of the flank,
As down on her haunches she shuddered and sank.

So, we were left galloping, Joris and I,
Past Looz and past Tongres, no cloud in the sky;
The broad sun above laughed a pitiless laugh,
'Neath our feet broke the brittle bright stubble like chaff;
Till over by Calhem a dome-spire sprang white,
And "Gallop", gasped Joris, "for Aix is in sight!"

"How they'll greet us!"—and all in a moment his roan
Rolled neck and croup over, lay dead as a stone;
And there was my Roland to bear the whole weight
Of the news which alone could save Aix from her fate,
With his nostrils like pits full of blood to the brim,
And with circles of red for his eye-sockets' rim.

Then I cast loose my buffcoat, each holster let fall,
Shook off both my jack-boots, let go belt and all,
Stood up in the stirrup, leaned, patted his ear,
Called my Roland his pet-name, my horse without peer;
Clapped my hands, laughed and sang, any noise, bad or good,
Till at length into Aix Roland galloped and stood.

And all I remember is—friends flocking round
As I sat with his head 'twixt my knees on the ground;
And no voice but was praising this Roland of mine,
As I poured down his throat our last measure of wine,
Which (the burgesses voted by common consent)
Was no more than his due who brought good news from Ghent.

## "THE PIPES AT LUCKNOW"

**By John Greenleaf Whittier**

Pipes of the misty moorlands,
Voices of the glens and hills;
The droning of the torrents,
The treble of the rills!
Not the braes of broom and heather,
Nor the mountains dark with rain,
Nor maiden bower, nor border tower,
Have heard your sweetest strain!

Dear to the Lowland reaper,
And plaided mountaineer,—
To the cottage and the castle
The Scottish pipes are dear;—
Sweet sound the ancient pibroch
O'er mountain, loch, and glade;
But the sweetest of all music
The pipes at Lucknow played.

Day by day the Indian tiger
Louder yelled, and nearer crept;
Round and round the jungle-serpent
Near and nearer circles swept.
"Pray for rescue, wives and mothers,—
Pray today!" the soldier said;
"Tomorrow, death's between us
And the wrong and shame we dread."

Oh, they listened, looked, and waited,
Till their hope became despair;
And the sobs of low bewailing
Filled the pauses of their prayer.
Then up spake a Scottish maiden,
With her ear unto the ground:
"Dinna ye hear it?—dinna ye hear it?
The pipes of Havelock sound!"

Hushed the wounded man his groaning;
Hushed the wife her little ones;
Alone they heard the drum-roll
And the roar of Sepoy guns.
But to sounds of home and childhood
The Highland ear was true;—
As her mother's cradle-crooning
The mountain pipes she knew.

Louder, nearer, fierce as vengeance,
Sharp and shrill as swords at strife,
Came the wild MacGregor's clan-call,
Stinging all the air to life.
But when the far-off dust-cloud
To plaided legions grew,
Full tenderly and blithesomely
The pipes of rescue blew!

Like the march of soundless music
Through the vision of the seer,
More of feeling than of hearing,
Of the heart than of the ear,
She knew the droning pibroch,
She knew the Campbell's call:
"Hark! hear ye no' MacGregor's?
The grandest o' them all!"

Round the silver domes of Lucknow,
Moslem mosque and Pagan shrine,
Breathed the air to Britons dearest,
The air of Auld Lang Syne.
O'er the cruel roll of war-drums
Rose that sweet and home-like strain:
And the tartan clove the turban,
As the Goomtee cleaves the plain.

O, they listened, dumb and breathless,
And they caught the sound at last;
Faint and far beyond the Goomtee
Rose and fell the piper's blast!
Then a burst of wild thanksgiving
Mingled woman's voice and man's;
"God be praised!—the march of Havelock!
The piping of the clans!"

Dear to the corn-land reaper
And plaided mountaineer,—
To the cottage and the castle
The piper's song is dear.
Sweet sounds the Gaelic pibroch
O'er mountain, glen and glade;
But the sweetest of all music
The Pipes at Lucknow played!

## PAUL REVERE'S RIDE

**By Henry Wadsworth Longfellow**

Listen, my children, and you shall hear
Of the midnight ride of Paul Revere,
On the eighteenth of April, in Seventy-five;
Hardly a man is now alive
Who remembers that famous day and year.
He said to his friend, "If the British march
By land or sea from the town tonight,
Hang a lantern aloft in the belfry arch
Of the North Church tower as a signal light,—
One, if by land, and two, if by sea;
And I on the opposite shore will be,
Ready to ride and spread the alarm
Through every Middlesex village and farm,
For the country folk to be up and to arm."

Then he said, "good night"! and with a muffled oar
Silently he rowed to the Charlestown shore,
Just as the moon rose over the bay,
Where swinging wide at her mooring lay
The Somerset, British man-of-war;
A phantom ship, with each mast and spar
Across the moon like a prison bar.
And a huge black hulk, that was magnified
By its own reflection in the tide.

Meanwhile, his friend, through alley and street,
Wanders and watches with eager ears,
Till in the silence around him he hears
The muster of men at the barrack door,
The sound of arms, and the tramp of feet,
And the measured tread of the grenadiers,
Marching down to their boats on the shore.
Then he climbed the tower of the Old North Church,
Up the wooden stairs, with stealthy tread,
To the belfry-chamber overhead,
And startled the pigeons from their perch
On the sombre rafters, that round him made
Masses and moving shapes of shade,—
By the trembling ladder, steep and tall,
To the highest window in the wall,
Where he paused to listen and look down
A moment on the roofs of the town,
And the moonlight flowing over all.

Beneath, in the churchyard, lay the dead,
In their night-encampment on the hill,
Wrapped in silence so deep and still
That he could hear, like a sentinel's tread,
The watchful night-wind, as it went,
Creeping along from tent to tent,
And seeming to whisper "All is well!"
A moment only he feels the spell
Of the place and the hour, and the secret dread
Of the lonely belfry and the dead;
For suddenly all his thoughts are bent
On a shadowy something far away,
Where the river widens to meet the bay,—
A line of black that bends and floats
On the rising tide, like a bridge of boats.
Meanwhile, impatient to mount and ride,
Booted and spurred, with a heavy stride
On the opposite shore walked Paul Revere.
Now he patted his horse's side,
Now gazed at the landscape far and near,
Then, impetuous, stamped the earth,
And turned and tightened his saddle-girth;
But mostly he watched with eager search
The belfry-tower of the Old North Church,
And it rose above the graves on the hill,
Lonely and spectral and sombre and still.
And lo! as he looks, on the belfry's height
A glimmer, and then a gleam of light!
He springs to the saddle, the bridle he turns,
But lingers and gazes, till full on his sight
A second lamp in the belfry burns!

A hurry of hoofs in a village street,
A shape in the moonlight, a bulk in the dark,
And beneath, from the pebbles, in passing, a spark
Struck out by a steed flying fearless and fleet;
That was all! And yet, through the gloom and the light,
The fate of a nation was riding that night;
And the spark struck out by that steed, in his flight,
Kindled the land into flame with its heat.

He has left the village and mounted the steep,
And beneath him, tranquil and broad and deep,
Is the Mystic, meeting the ocean tides;
And under the alders that skirt its edge
Now soft on the sand, now loud on the ledge
Is heard the tramp of his steed as he rides.
It was twelve by the village clock
When he crossed the bridge into Medford town.
He heard the crowing of the cock,
And the barking of the farmer's dog,
And felt the damp of the river fog,
That rises after the sun goes down.

It was one by the village clock
When he galloped into Lexington.
He saw the gilded weathercock
Swim in the moonlight as he passed,
And the meeting-house windows, blank and bare,
Gaze at him with a spectral glare,
As if they already stood aghast
At the bloody work they would look upon.

It was two by the village clock
When he came to the bridge in Concord town.
He heard the bleating of the flock,
And the twitter of birds among the trees,
And felt the breath of the morning breeze
Blowing over the meadows brown.
And one was safe and asleep in his bed
Who at the bridge would be first to fall,
Who that day would be lying dead,
Pierced by a British musket-ball.

You know the rest. In the books you have read,
How the British Regulars fired and fled,—
How the farmers gave them ball for ball
From behind each fence and farm-yard wall
Chasing the red-coats down the lane,
Then crossing the fields to emerge again
Under the trees at the turn of the road,
And only pausing to fire and load.

So through the night rode Paul Revere;
And so through the night went his cry of alarm
To every Middlesex village and farm,—
A cry of defiance, and not of fear,
A voice in the darkness, a knock at the door,
And a word that shall echo for evermore!
For, borne, on the night wind of the Past,
Through all our history, to the last,
In the hour of darkness and peril and need,
The people will waken and listen to hear
The hurrying hoof-beats of that steed,
And the midnight message of Paul Revere.

## Suggestions For Culmination Of Enterprise

1. Make an apple-box movie showing development of communication.
2. Present a radio program, dramatizing the story of communication. Trace the history of communication stressing the contributions of the great inventors and the pioneers and the importance of communication to the world to-day. The program should include songs, poetry, pantomime-stories, plays.
   This type of program should summarize what has been learned and should give some experience in the use of tape-recorders, microphones, etc.
3. Arrange an exhibition, "From Tom-toms to Television", setting up booths for exhibits. Have posters, charts, models, and demonstrations to show the progress made in means of communication through the centuries.

### Evaluations

1. Tests for evaluating knowledge gained.
2. Evaluation of reports and notebooks.
3. Observation of social behaviour.

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Chatterton, W. Gordon—Canada and Other Lands
Rogers and Beard—Heels, Wheels and Wire
Webster, Hanson Hart—The World's Messengers
Wilson, Howard E.—Richer Ways of Living. Boston: American Book Co., 1951
Hartmann—Builders of the Old World
Campbell et al.—Old World Past and Present

### Books That May Be Obtained from The Publishers

Nida, William L.—Man Conquers the World With Science
Rugg and Krueger—Man at Work—His Industries
Canadian Parade Readers—Proud Procession—The Big Three in Radio
Miles, John—The Magic of Communication, Information Department, American Telephone and Telegraph Co., New York
McKeown—At Home and Abroad

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Highroads to Reading Book VI—The Telephone (old reader)

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Hubbard, Grace Thompson, Laura Mae Carlisle and Helen Ferris. "My Poetry Book": An Anthology of Modern Verse for Boys and Girls. Philadelphia: John C. Winston Co. 1934

### Music References

New Music Horizons: Book IV: The Church Bells, Ceremonial Dance, The Bugle Call
Book V: About the Radio. Silver Burdett Co. New York

Music Around the World: Music for Living Series.

Feng Yang Song, Silver Burdett Co. Chicago.

Singing Every Day: The Bell Ringer. Ginn and Co. Toronto.

# What Does Echo Say?

5104 A

I. W. — Irving Wolfe

*Lightly*

♦ What does ech - o say? Try it an - y day,
Want to sing with me? Lis - ten care-ful-ly,

♦ 1. What does ech - o say? Try it an - y
2. Want to sing with me? Lis-ten care-ful-

• An - y - thing we call just bounc-es back in play.
Rol-lick - ing my song, now sing it back in glee.

day, • What you call just bounc-es back in play.
ly, Gay your song, I'm sing - ing back in glee.

*f* *p*

♦ Loud-ly like a man, Soft-ly as you can,

*f* *p*

♦ Loud-ly like a man, Soft - ly as you

*mf cresc.*

• You're a per - fect part-ner, Fun to sing "Catch can!" ♦ "Catch

*mf cresc.*

can, • Per - fect part - ner! Fun to sing, "Catch can!"

can!" "Catch can!" • "Catch can!"

♦ Catch can!" "Catch can, • catch can!"

CHORDS: I = G Maj.; II = A min.; $V_7 = D_7$

Courtesy Follett Publishing Co.
Chicago, Illinois

# AUDIO - VISUAL AIDS FOR UNIT

## PROBLEM I

### Film

| | |
|---|---|
| Development of Communication | T 194 |

### Filmstrips

| | |
|---|---|
| History of Communication (Y.A.F.) | P 920 |
| Early Communication (Curr.) | PK 2218 |
| A Century of Progress in Communication (C.O.I.) | P 3000 |
| A History of the Written Word (Eye Gate) | P 1624 |
| The Story of Writing (B.I.F.) | P 1347 |

## PROBLEM II

### Films

| | |
|---|---|
| Newspaper Story | T 709 |
| Behind the Headlines | T 329 |

### Filmstrips

| | |
|---|---|
| Newspaper (Y.A.F.) | P 1948 |
| Jack Sees the News Made (S.V.E.) | P 1452 |
| Getting the World's News (Wayne University) | P 2063 |
| Writing and Printing (Curr.) | PK 2217 |
| The Story of Books (B.I.F.) | P 1348 |

## PROBLEM III

### Filmstrips

| | |
|---|---|
| A Day at the Lighthouse (Curr.) | PK 2441 |
| Indian Communication (Curr.) | PK 1827 |

## PROBLEM IV

### Films

| | |
|---|---|
| The Story of Paper Making | T 749 |
| Stagecoach to the Stars (Canadian Postal Service) | T 834 |
| Pulp and Paper from Canada | T 710 |

### Filmstrips

| | |
|---|---|
| Mail, Historical Survey (S.V.E.) | P 669 |
| Canada, Stamp by Stamp (N.F.B.) | PK 800 |

## PROBLEM V

### Filmstrips

| | |
|---|---|
| Cables (S.V.E.) | P 665 |
| Radio (Y.A.F.) | P 1950 |
| Television (Y.A.F.) | P 1949 |
| Electricity in Communication (Curr.) | PK 2219 |
| Wonder of the Telephone (Eye Gate) | PK 2880 |
| Care of Eyes and Ears (Curr.) | PK 2381 |
| Wonder of the Phonograph (Eye Gate) | PK 2881 |
| Motion Pictures (Y.A.F.) | P 1951 |
| Alexander Graham Bell (Y.A.F.) | PK 2957 |
| Thomas Alva Edison (Y.A.F.) | PK 2959 |
| Samuel F. B. Morse (Y.A.F.) | PK 2962 |
| Gugielmo Marconi (Eye Gate) | PK 2703 |
| Radar with the R.A.F. (U.K.I.S.) | P 382 |
| Benjamin Franklin (Curr.) | PK 2475 |
| Samuel F. B. Morse (Curr.) | PK 2478 |

**These are available from the Department of Education**

## KEY TO FILMSTRIP SOURCES

| | |
|---|---|
| B.I.F. | British Instructional Films Ltd.<br>Film House<br>Wardour Street<br>London, W.1., England |
| C.O.I. | Central Office of Information<br>83 Baker Street<br>London, W.1., England |
| Curr. | Curriculum Films<br>available from:—<br>Johnson Bros.<br>Record Shop<br>5512 - 20th Avenue N.W.<br>Seattle 7, U.S.A. |
| Eye Gate | Eye Gate House<br>2716 - 41st Avenue<br>Long Island City, N.Y., U.S.A. |
| N.F.B. | National Film Board<br>South Side P.O.<br>Edmonton, Alberta |
| S.V.E. | Society for Visual Education<br>available from:—<br>General Films Ltd.<br>1534 Thirteenth Avenue<br>Regina, Saskatchewan |
| U.K.I.S. | United Kingdom Information Service<br>119 Adelaide Street W.<br>Toronto, Ontario |
| Wayne University | Wayne University<br>College of Education<br>Detroit, Michigan, U.S.A. |
| Y.A.F. | Young America Films<br>available from:—<br>General Films Ltd.<br>1534 Thirteenth Avenue<br>Regina, Saskatchewan |

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